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ORIGINAL ARTICLES.

PRE-ATAXIC TABES DORSALIS, WITH OPTIC-NERVE ATROPHY.

BY HOWELL T. PERSHING, M.Sc., M.D.,
PROFESSOR OF NERVOUS DISEASES IN THE GROSS MEDICAL COLLEGE,
DENVER, COLORADO; PHYSICIAN TO THE ARAPAHOE COUNTY
HOSPITAL AND TO ST. LUKE'S HOSPITAL.

THE following cases are reported because they belong to a well-defined variety of disease that is worthy of special discussion on account of certain peculiarities, both as to diagnosis and prognosis.

CASE I.—C. L., a printer; is thirty-eight years of age. His mother died of "neuralgia of the stomach." One of the mother's sisters was insane, and the patient's only sister is very nervous and excitable. He has used tobacco and malt liquors in moderation. He had a single venereal sore four years ago and several a year later. An eruption (diagnosed syphilitic) was present a few months ago. For three years past he has had an annoying tremor during effort or excitement. Vision began to fail in the left eye in April, 1889, and grew steadily worse until January, 1890, when vision in the right eye also became much impaired, the left seeming to improve. Transient ptosis on the left side was noticed several times. The knee-jerks were found absent in November, 1889. Potence was lost soon after failure of vision. The man could read with the right eye up to June, 1890, when atropine was instilled, causing immediate loss of power to read, which did not return. During the summer and fall of 1890, there were shooting pains in the legs and occasional retention or involuntary evacuation of urine.

Present condition, November, 1890: Can barely see a hand close to face. Cannot count fingers. Pupils equal, moderately contracted; light reflex scarcely perceptible; accommodation reflex could not be tested. White atrophy of both optic discs.

Knee-jerks entirely absent, even with Jendrassik's reinforcement. Plantar and cremasteric reflexes present; abdominal excessive. Station with eyes closed normal; stands on either foot. Walks backward perfectly well. No ataxia of arms or legs, unless in left leg in so slight a degree as to be doubtful. No intention-tremor is present, no paralysis, and no wasting. No defect in touch, pain, posture, temperature, or muscular sense is detected by careful examination. Hearing is normal for watch and tuning-fork, and the auditory field is not limited for high notes. Taste and smell are normal. The pharynx and larynx are normal, except that the reflexes are heightened. He complains of shoot-

ing pains, especially in the left thigh and testicle, though these are not severe. There is a feeling of tremor in the intestines and genitals; a numbness of the buttocks and rectum; a lack of normal sensation during defecation, and, at times, involuntary defecation. Normal action of the bladder and potency have returned, apparently owing to the administration of strychnine.

On January 31, 1891, he reported that two nights previously his breathing was suddenly stopped by what seemed an obstruction in the throat that could not be cleared by coughing; he was greatly alarmed and trembled violently. (Laryngeal crisis.)

CASE II.—E. P., a shoemaker; is fifty-three years of age, and married. His mother died at seventy-six, of "softening of the brain." Father, brothers, and sisters are said to be very nervous. Two brothers and three sisters died of pulmonary tuberculosis, one brother of diabetes. He has been a constant though moderate chewer and smoker, but has never been a drinker, and there is no syphilitic history, though he admits exposure.

Sudden blurring of vision in the left eye occurred five years ago, which was said at the eye dispensary to be due to an affection of the nerve. Recovery took place in a week. For four years past he has had annoying sensations in the soles, palms, instep, and inside of elbow, making it difficult to keep still. The thighs feel as though abraded in front. Sometimes the touch of the bed-clothes is unendurable. In July, 1890, the left eye again began to fail, and has grown worse. A few months later the right was affected. Of late there has been drooping of the left lid. Difficulty in urination is complained of, there being no force to the stream. Putting the hands in cold water causes involuntary micturition. Potence is much diminished; at times there is absolute impotence. He has had hard coughing spells, without apparent cause and without expectoration.

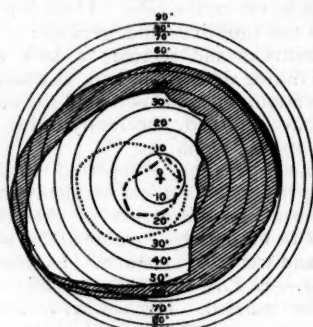
The present condition, January 15, 1891, is as follows: Vision: right, $\frac{5}{6}$; left, $\frac{1}{10}$. The fields are much contracted, both for white and colors, especially on the nasal side. (See the annexed diagram.) Both optic papillæ are sharply defined and of a grayish tint. The right pupil reacts well to light; the left is contracted, irregular in contour, with light reaction barely perceptible. Both react well in convergence. The knee-jerks are present, and are increased by reinforcement, but the left is considerably less than the right, which is rather below the average. With eyes closed he can stand on either foot, and walks well. There is no ataxia of the arms or legs; no paralysis or wasting; no defect in touch, temperature, or posture-sense. Hearing: right, $\frac{5}{10}$; left, $\frac{1}{10}$. There is otitis media of both sides. Bone-conduction is good. Taste and smell are normal. Laryngoscopic examination is unsat-

isfactory, the pharyngeal reflex being excessive. Heart and lungs are normal.

On February 3, 1891, vision in the right eye has fallen to $\frac{1}{60}$, and the field is further narrowed in the upper part.

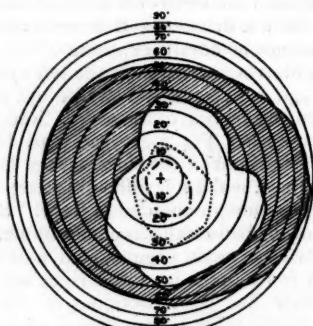
June 3, vision—right, $\frac{1}{30}$; left, $\frac{1}{10}$. The patient has a band-like feeling about the head. The knee-jerks are present.

FIG. 1.



Left eye. Visual field.

FIG. 2.



Right eye. Visual field.

The striking feature about each of these cases is the presence of decided atrophy of the optic nerve with the absence of ataxia, and even of Romberg's symptom. The spinal symptoms were so unobtrusive that both patients sought relief only for failing sight, and in one case the knee-jerks still remain, though diminished and unequal. That optic atrophy prevents the occurrence of other symptoms seems at first sight most improbable, yet there is evidence that in some way it does so. It has long been known that optic atrophy may for years precede other symptoms of tabes. Charcot¹ describes a case of blindness due to primary atrophy, with lightning-pains occurring three years later, followed shortly by gastric crises, but with no difficulty in locomotion as late as twenty-nine years after the onset. In another of

his cases blindness, due to atrophy, came on simultaneously with lightning-pains, gastric crises following, but there was no incoördination fifteen years later. He says other such cases might be cited, and reaffirms, as amply supported by increased experience, a former statement that the great majority of all the patients coming into the Salpêtrière with amaurosis afterward develop the symptoms of tabes, though perhaps not until ten or fifteen years later. Had the knee-jerk then been known, its loss would doubtless have led to a somewhat earlier diagnosis. Gowers² says: "So marked, indeed, is the contrast between the course of different symptoms that it suggests a certain alternative tendency. If optic-nerve atrophy develops, the spinal symptoms in most cases remain stationary. So, too, of visceral crises. I have known gastric crises to cease when the incoördination began to develop." Walton,³ of Boston, has collected and reported evidence supporting this statement. After quoting Charcot and citing cases of Gowers and Buzzard, in which optic atrophy, pains, and loss of knee-jerk were the only symptoms for fifteen, sixteen, and twenty years, respectively, he gives an analysis of 66 cases of tabes. Of these, 14 presented optic atrophy, and 6 others, not examined with the ophthalmoscope, loss of sight. Of the 14 with atrophy, 3 exhibited no ataxia, 5 were slightly ataxic, 3 were decidedly ataxic, and, in 3 others, the symptom is not mentioned. The duration of the 8 non-ataxic or slightly ataxic cases was 2, 3, 4, 7, 8, 10, 12, and 12 years, respectively. The general result of this investigation is that in the presence of atrophy of the optic nerves there is a remarkable abeyance of other symptoms, especially of ataxia.

To obtain further evidence as to the practical importance of this apparent antagonism between symptoms, I have studied a series of 40 cases of tabes dorsalis, reported by Marina,⁴ of Trieste. These are especially suitable, because, while this particular question is not touched upon (aural and laryngeal symptoms being the special object of research), the patients were generally thoroughly examined. Of these cases ataxia was present in 22, absent in 18. The separation of ataxia and optic-nerve atrophy is shown in the following table:

	Ataxia present.	Ataxia absent.
Advanced optic atrophy (recognized by ophthalmoscope, fields limited, vision one-third or less).	2	9
Beginning atrophy	6	5
Disks normal	3	3
No failure of vision noted; no ophthalmoscopic examination	11	1
	22	18

¹ Diseases of the Nervous System, Am. ed., p. 102.

² "Latency of Ataxic Symptoms in Cases of Optic Atrophy," Boston Med. and Surg. Journ., Aug. 1, 1889.

³ Archiv für Psychiatrie, Band xxi, Heft 1.

⁴ Leçons sur les Maladies du Système Nerveux, t. ii, pp. 40-46.

The preponderance of advanced atrophy in the non-ataxic cases is evidently too great to be accidental. Nor is it accidental that of 12 cases in which the ophthalmoscope was not used, 11 were ataxic. The pupils were tested in all of these, and muscular insufficiencies noted in some, so that any failure of sight would also have been noted. It is fair, then, to assume that this group does not include cases of advanced atrophy, and it probably does include most of those with normal optic nerves. One of the two ataxic cases with advanced atrophy was remarkable for a very wide range of symptoms and rapid course; paraparesis and muscular atrophy, as well as ataxia, appearing early. The other was of seven years' duration, and had run the usual course. Up to the last examination the duration of the 9 non-ataxic cases with optic atrophy was 1, 1, 2, 3½, 5, 5, 6, and 10 years (in one not stated), respectively, averaging over 4 years, which is longer than the average time after onset in which ataxia was found on examination in the ataxic cases, although it had doubtless been present at a considerably earlier date in many of them. But, aside from the question of duration, it is evident that if, in a sufficiently large number of cases, there is a greater proportion with optic atrophy in the pre-ataxic stage, then the atrophy must in some way be associated with the prevention of ataxia; for atrophy never disappears, and if these cases went on into the ataxic stage at the usual time it would still be found in the same proportion.

It would be important to know whether degeneration of the auditory nerve in tabes is also more frequent in non-ataxic cases. This is difficult to ascertain because disease of the inner ear is not always easy to diagnose, and does not necessarily mean degeneration of the nerve, unless the auditory field is progressively limited.

The ears were examined with unusual care in all of Marina's cases. Disease of the inner ear was diagnosed in 13 and suspected in 2 of the 18 non-ataxic cases (72 or 83 per cent.); of the 22 ataxic cases it was diagnosed in 9 and suspected in 4 (41 or 59 per cent.). It, therefore, appears as if disease of the inner ear to some extent excluded ataxia. On the other hand, laryngeal palsies were found twice as often in the ataxic cases as in the non-ataxic.

Romberg's symptom was entirely absent from 7 of Marina's cases. Of these, all had inner-ear disease except one, in which it was doubtful; 4 had advanced optic atrophy; 1 beginning atrophy; 2 normal discs. Contrast this with 29 cases in which, with Romberg's symptom fully developed, there were 14 with inner-ear disease and 5 with advanced atrophy.

The knee-jerk was absent or unequally dimin-

ished in the entire series. Of 7 cases with some remnant of it, advanced optic atrophy was present in 2; beginning atrophy in 3; disease of the inner ear in 4, suspected in 2 more; either advanced atrophy or inner-ear disease was present in all except one, and in that one inner-ear disease was suspected.

Walton¹ found the knee-jerk present to some extent in 4 of 9 cases of tabes with optic atrophy; and it was normal in another with loss of sight, but no ophthalmoscopic examination was made. In one of Gowers's² cases "all the symptoms of tabes passed away, the knee-jerk returned, optic nerve atrophy ceased to advance, but the patient became insane." It is probable, therefore, that even the loss of knee-jerk may be at least delayed by activity of the disease in the optic or auditory nerve or cerebral cortex. The proof is not likely to be proportionate to the fact, because the presence of the knee-jerk is commonly regarded as excluding tabes.

Dr. L. C. Gray³ has reported a case of tabes complicated by general paresis, in which the occurrence of mental hebetude seemed to cause an improvement in the tabetic symptoms.

If it be true that there is any mutual exclusiveness in the symptoms of tabes, it not only suggests interesting pathologic reflections, but necessitates some modification in the existing rules of diagnosis. Thus the presence of optic atrophy makes a comparatively small amount of additional evidence sufficient to establish the diagnosis of tabes. Indeed, primary bilateral atrophy alone makes the existence of tabes probable. Nettleship⁴ found that of 76 cases of primary bilateral atrophy 58 certainly, and 10 more probably (76 or 90 per cent.), were due to the same causes that give rise to degenerative changes in the spinal cord and brain. Uthoff⁵ found that of 83 cases of atrophy, not neuritic or due to causes in the orbit, 69 (83 per cent.) were due to spinal or cerebral disease. Peltessohn⁶ found that of 98 cases of spinal or cerebro-spinal atrophy occurring in Hirschberg's clinic, 78 (80 per cent.) were cases of tabes dorsalis. Combining these statistics it appears that in a case of bilateral atrophy without assignable cause the chances are two to one that it is a symptom of tabes. If the knee-jerk is gone, the diagnosis is practically certain. But the presence of the knee-jerk in such a case by no means excludes tabes. True, Gowers' says that if it is present the diagnosis can be justified only by

¹ Op. cit.

² Diseases of the Nervous System, Am. ed., p. 302.

³ New York Neurological Society, October 1, 1889, reported in THE MEDICAL NEWS, November, 2, 1889.

⁴ Quoted by George A. Berry, "Diseases of the Eye," Am. ed., p. 315.

⁵ Ibid.

⁶ Archives of Ophthalmology, xvi.

⁷ Loc. cit., p. 316.

distinct and characteristic incoördination. But this statement is certainly ultra-conservative. No one doubts that the knee-jerk does remain for a time after the onset of true tabes. Indeed, it is probably exaggerated at first.¹ The only question is whether the disease can be recognized in the absence of ataxia, with the knee-jerk present. I think it can, if there is a characteristic combination of minor symptoms, and especially if the negative evidence is neutralized by the presence of such a condition as optic atrophy, which has been shown to exclude the cardinal symptoms to a certain extent.

In the second case that I have just reported, we have the presence of the knee-jerks and complete absence of Romberg's symptom, ataxia, and anesthesia; but against this is to be placed optic atrophy, the Argyll-Robertson pupil, transient ptosis, paresis of the bladder, occasional incontinence of urine and impotence, so that I think the diagnosis is fully justified, even without taking into account the unequal diminution of the knee-jerks.

But little need be said as to the prognosis in this variety of tabes. As to the spinal symptoms, it is certainly comparatively good. Gowers² says that most cases do not go beyond the first stage. Unfortunately the atrophy usually progresses to nearly complete blindness, and it would be no consolation to the unfortunate patient to tell him that he will probably be saved from the tortures of a spinal disease, as yet unknown to him, at the expense of sight, the loss of which he dreads above all things. Still, the earlier the diagnosis the less gloomy is the outlook, for unhygienic conditions may be altered and judicious treatment may aid in arresting the morbid process.

P. S.—In the interval between writing this article and reading the proof, I have seen two cases of optic atrophy due to tabes, and a third probably of the same nature. I herewith briefly mention them.

A. S., a male, fifty-eight years old, had a severe fall twenty years ago. Lightning pains appeared soon afterward. He had to abandon his trade, six years ago, on account of failing vision. There is atrophy of both discs; the visual fields are contracted; vision is $\frac{5}{20}$ in each eye; Argyll-Robertson pupil is present; micturition is retarded. The knee-jerks are absent. There is *no ataxia* and *no Romberg's symptom*.

A. G., a male, forty-five years old, noticed that his sight began to fail twenty-five years ago. He has had shooting pains for at least fifteen years past. Vision: on the right there is light-perception; on the left he counts fingers at one foot. The pupils are unequal; Argyll-Robertson reaction is present. The knee-jerks are absent. Romberg's symptom is present. There is very slight, though distinct, ataxia of the arms and legs. The patient had been

twice examined by pension-examiners, but complained of nothing but loss of sight. He was much surprised when told that he had a grave form of nervous disease.

G. E., a male, forty-eight years old, had noticed that vision began to fail two years ago. Vision: on the right he cannot count fingers, but he sees the hand; on left, $\frac{5}{20}$. The optic discs are atrophied. The pupils are contracted; they react slightly to light, but well in accommodation. The knee-jerks are sluggish. There are no shooting pains; no Romberg's symptom; no ataxia. The man feels perfectly well, except for his loss of sight.

SHOULD TUBERCULIN BE ADMINISTERED IN PRIVATE PRACTICE?

BY KARL VON RUCK, B.S., M.D.,
OF ASHEVILLE, N. C.

I AM frequently in receipt of inquiries from physicians who contemplate using tuberculin, as to my method of administration, and I note from such inquiries, and also from various publications in the medical journals, that even now an amount of experimentation with this agent is carried out which, in my opinion, is in no wise justifiable, for, if anything is apparent in the voluminous literature upon the subject, as to its practical application, it is that, apart from the favorable results observed, it may become a source of serious injury, if improperly given, or if its effects are not thoroughly understood.

The remedy may also fail to accomplish good results, and disaster may follow its use, when the general management and supervision of the case are in any way faulty; and under the most favorable conditions of dosage, selection of cases, and perfect management, other means are frequently essential in order to effect a recovery, the remedy constituting an aid more or less important, but not an unfailing specific, to the administration of which a cure must necessarily follow.

I believe that my experience of more than a year justifies me now in repeating the statement that the remedy *can be given* with the avoidance of every danger, unpleasant symptom, or discomfort, in suitable cases, under proper management and supervision, and I believe that its influence is then beneficial, not alone because my results have been highly satisfactory, but also because trustworthy and able observers have recorded excellent results in cases in which the additional aid of climate and other treatment were not possible factors, as has been the case with my own patients.

Although there are now cases recorded amounting to thousands, in which apparent recovery, or unusual improvement, is claimed to have resulted from the use of the remedy by authorities whom we cannot doubt, and from the records and descriptions

¹ Weir Mitchell, THE MEDICAL NEWS, April 21, 1888.

² Loc. cit., p. 319.

of the cases, the remedy stands in reasonable relation to the cure or improvement. Now, although the curative effects have had frequent corroboration by ocular demonstration of healed tuberculous processes in almost every organ of the body, it must be conceded that if such an effect were demonstrated to be undoubtedly the result of tuberculin employed in only one single case that was truly cured or improved by the remedy, then, under the same conditions, a cure or improvement may again result; and failure to accomplish it must be sought either in the selection of cases, the method of application, faulty management, or conduct of patients while being treated, in the response of the particular organism to the remedy, or finally, in the variations and possible deterioration of the tuberculin itself, but certainly not in its value as a curative agent.

The object of this paper is the consideration of the feasibility of employing tuberculin in private practice, and thus enlarging its usefulness; and by considering the conditions stated, upon which I claim that success or failure must depend, the reader can answer for himself whether or not he shall employ tuberculin at all, or make use of it in hospital or private practice.

1. *The proper selection of cases.* The patient must be in fair physical condition. A loss of more than 20 per cent. of his average weight in health, especially if he is still losing, should for the time exclude him from the treatment until the cause for the progressive emaciation is found and removed.

He must be practically free from fever. As long as he reaches an evening maximum of 101° F., or more, the greatest circumspection would certainly be necessary.

There should be a fairly good heart-action: A pulse-rate (during rest) averaging 112 or more for the time contra-indicates the use of the remedy, as does also the existence of a considerable degree of anemia.

It goes without saying, that the earlier the stage of the disease, the smaller the area of lung involved, the better are the prospects. Regardless of the particular advance of the disease in the particular lung-portion, the vital capacity is the best criterion; if this should have fallen below one-third of the amount which, according to my published table,¹ corresponds to the patient's height and sex, the case should for the time be excluded, until other means shall have accomplished an improvement in this respect.

The presence of considerable fibro-plastic pleural exudations of tuberculous origin requires the greatest caution; cases with infiltration, already giving evidence of beginning breaking down,

accompanied by chills and fever, must certainly be excluded.

The presence of a cavity is of itself no contra-indication, but acute inflammatory processes in or about the cavity exclude the case until these are arrested by other means.

Amyloid degeneration in the kidney, liver, and intestine exclude the case.

Tuberculous processes of other organs do not constitute contra-indications in themselves, except when located in the joints and such localities where no outward discharge is possible, unless in the earliest periods of their development; in all other stages, surgical means must precede the employment of tuberculin. Only in the milder cases of intestinal tuberculosis can tuberculin be employed with a prospect of success, and the doses must be very small, beginning with one-twentieth of a milligram.

The most favorable cases are, therefore, those without fever, or with a maximum of not more than 100° F., therefore without acute processes, in still a fair condition of general nutrition, and a vital capacity of two-thirds or more of the amount corresponding to sex and height, a relatively good heart-action and good digestive organs; under other conditions other means must precede, and frequently have succeeded in my hands in preparing the case, so that the treatment with tuberculin can subsequently be employed with benefit.

2. *The proper mode of administration.* There must precede a period of at least a week or more for study, investigation, and observation of the case. No statement of the patient as to his previous condition must be accepted in lieu of such study. The temperature and pulse must be observed and recorded every two hours, the sputum and urine must be examined. At least two comparative physical examinations should be on record before beginning the treatment.

The first, or trial dose, should never exceed one-fifth of a milligram. One-tenth is better in cases in which caution is advised in their selection.

The increase is then by one-tenths up to one milligram, then by halves to five milligrams, finally by milligrams up to ten.

After an injection the patient must be kept free from mental excitement and physical exertion, and all influences must be eliminated that may influence pulse, temperature, or the local tuberculous process.

Records of physical examinations, pulse, fever, respiration, appetite, urine, weight, etc., must go hand-in-hand with the continuance of the treatment.

No dose is ever to be increased until no local response has been manifest to the two preceding doses. General symptoms, especially chill or fever, must never be produced.

The remedy is thus given daily, or every other

¹ Gaillard's Medical Journal, October, 1891.

day, according to the effect produced in the local tuberculous process. All general effects, even when transient, and all local effects lasting more than twenty-four hours, are to be considered as due to an overdose, and require an intermission until they have been absent at least twenty-four hours, and then the dose is to be diminished to the dose that last given had produced no effect upon two successive administrations.

It may be found that the patient now responds to this last dose also, after a local, stimulating, or irritative effect upon the tuberculous process has once been set up, and in such case the preceding dose which had no effect must be adopted. I have thus lately seen a response to seven, then to six, to five, and last to four, but none to three milligrams, but no response again until ten milligrams were gradually reached. At no time was there fever, but the effect appeared in the local tuberculous process, with increased cough, and was manifest by a temporary increase in the physical phenomena elicited by comparison with the previous examination on record, made after the effect of the last active dose had subsided.

In most cases treated by me lately ten milligrams were not exceeded. Frequently I stop at five milligrams, allow an intermission of several weeks, and then repeat the treatment, under a more rapid increase until the previous maximum dose is again reached.

The evidences of successful treatment appear in the course of from two to six weeks, and consist in the subsidence of local auscultatory phenomena, such as râles and crepitation; the harsh, rude, or bronchial respiration becomes less marked, a suppressed, slightly vesicular murmur gradually taking its place; the percussion-phenomena indicate increasing fibroid or connective-tissue changes; cavities become clear, free of râles, and shrink; the patient increases in weight and strength; cough and expectoration become less, and he is sensible of a change for the better.

The occurrence of increasing anemia indicates the combination of oxygen-inhalations with the internal use of preparations of iron, and a reduction in the dose of tuberculin until the blood-making processes improve.

When all moist and dry auscultatory phenomena have disappeared, and fibroid changes are clearly manifest, it is best to stop the administration of the remedy and keep the case under careful observation.

Such administration means almost constant professional attention, daily physical examination; and in cases showing even a slight local reaction, the examinations are even more frequent—two or three times the same day. While no harm may result in

a particular case, anything less means to invite relapses and injurious consequences as a result of the treatment by which we hope to, and can obtain benefit. Unless so managed, a slight reaction may escape us, leading with increasing doses to constitutional symptoms, at a time when the indication really is for intermission and subsequent decrease in dosage, and disaster may then be the consequence, the blame falling to the remedy, instead of where it properly belongs. Similar results follow the exhibition of other remedies, when their effects are not carefully observed.

It may be urged that good results have been observed from the use of tuberculin with much less care and caution than I recommend, and this I concede freely. Indeed, such results have followed when the conditions that I strive to avoid by the greatest care and circumspection have purposely been induced. That was, however, the particular patient's "good luck," while in many other cases injury and indifferent results were the consequence of the early experimental and reckless use of the remedy.

In over 4000 injections given by me upon the plan I advocate, I have never seen an injury or even discomfort in a single case, which fact alone would justify all the care and precautions adopted; and with the exception of two or three cases in my early experience, which, as I now understand the selection of cases, were unsuitable for the treatment, improvement, and in many cases permanent arrest and apparent cures have been accomplished, and are still being accomplished, and in the apparently cured cases no relapses have as yet occurred. In no single instance have I failed to bring about improvement.

3. *Faulty management.* In my papers on the "Management of Pulmonary Tuberculosis,"¹ and the "Cure of Pulmonary Tuberculosis upon the Principle of Nutrition,"² I defined what constitutes the proper management of a patient suffering from pulmonary tuberculosis. Such management is prerequisite, no matter what special treatment is carried out in addition. If we use tuberculin we should, if anything, increase our general precautions to avoid conditions that favor relapses, because with it as well as with any other method, success depends upon maintaining and increasing the patient's nutritive processes, because apart from other dangers likely to follow, any general or prolonged local reaction reduces the patient in weight and strength, and otherwise interferes with his nutrition. To any physician who has closely observed not only the disease, but also the subject of the disease—the patient—my statement suffices that consumptive patients are constantly committing errors of various sorts, which are more or

¹ Therapeutic Gazette, August 15, 1889.

² Dietetic Gazette, November and December, 1891.

less opposed to the principles that I claim are the bases for success, and neither tuberculin nor any other remedy can protect them from the ill, and sometimes serious or even fatal effects of their errors and indiscretions. On the contrary, the dangers may be increased by the use of tuberculin, at least with some patients, when it shows a decided effect upon the heart-action.

To prevent these, in office or general practice, the patient must be either one of such extraordinary intelligence and unswerving determination as we seldom or never see, or else his case must be an unusually favorable one by reason of an excellent constitution and exceptional recuperative powers. Such patients, however, are not often the subjects of pulmonary tuberculosis.

I find in actual experience, based upon many hundreds of patients, that advice and restraint in one direction or other, and appeals to their determination and steadfast purposes for recovery, are, to a varying degree, required with all patients, and that even then slips occur that throw obstacles in the path of recovery. Conditions calculated to prevent injuries, in the way of personal surroundings and matters of hygiene, comfort, diet, clothing, etc., are seldom secured or enough appreciated by patients in their own homes, or at the boarding-houses and hotels of climatic resorts; neither can the attending physician be constantly present to show and direct the way.

Such being the case under any circumstances the question now arises, Shall we administer so subtle a remedy as tuberculin appears to be to patients in our offices, or upon visits at their residences, and then trust to good luck that the remedy will act favorably?

I doubt that any physician will answer in the affirmative, who, apart from the use of tuberculin, can appreciate the manifold causes that may aggravate the physical phenomena and symptoms in the course of the affection; and if the remedy is to be given only under the precautions I have found essential, how can there be an intelligent procedure as to the necessary repetition and increase of doses?

The fact that, in a given case, not disaster but good results have followed careless administration is no argument whatever in its favor.

I have known of a capital operation performed upon a filthy patient, in a dirty room, by a surgeon who was wanting not only in his own personal cleanliness, but who was utterly ignorant of every principle of antiseptis, and of the modern principles of the treatment of wounds, who during part of the operation had his instruments upon the floor of the room, or upon the unclean bed and table, who applied dirty bandages over and over again, and yet this patient made a good recovery. But

who would willingly and knowingly entrust his case to such care, and where is the surgeon that can countenance such work?

In pulmonary tuberculosis, and in other diseases as well, the chances of improvement and recovery become less in proportion as we relinquish advantages that can aid in the attainment of these ends; and so long as an institution can show greatly better results than are obtained in private practice, just so long must the treatment there have the preference, the importance of its adoption depending upon the difference in the results. If, then, tuberculin can be administered more intelligently and more successfully in institutions and hospitals than in private practice, its use should be confined to them, at least until it can be shown that ill effects do not attend its use in private practice.

When good results, and *no ill effects*, from the remedy appear in private practice, then it may become a matter of expediency, but the choice must ever fall to the institution until the results are as good without the safeguards that there surround the patient.

However, every institution is not necessarily a good one, and differences in results may be expected according to individual management, and the painstaking scientific methods of professional administration.

4. *Other aids to recovery.* Apart from a correct and individual management, there are many other aids to the successful treatment of pulmonary tuberculosis that are as important, and under certain conditions more important, than the use of tuberculin, or that of other remedies employed for their effect upon the local condition of the lung.

These include the proper use of climate, a rational treatment of the fever by rest, hydropathic methods and stimulants, singly or combined, to the almost entire avoidance of drug-antipyretics.

It is utterly impossible to successfully carry out such procedures, except in an institution. The treatment of gastric and intestinal catarrh, in addition to a proper diet, frequently requires washing out and direct medication of the stomach, chemical analysis of its contents, etc.—things very difficult to do when the patient needs to be visited at his home.

The pneumatic cabinet in my hands accomplishes good results, and in some cases is an aid I would be entirely unwilling to dispense with. I employ it with evident and well-marked benefit in most cases that receive tuberculin, when no special contra-indication exists.

Because the patient takes tuberculin, or any other remedy, local treatment of affections of the nose and throat, and catarrhal states of the bronchi, are not to be neglected any more than the sys-

tematic out-of-door life in a favorable climate, and the results must in proportion be better as we intelligently combine the various means at our disposal, rather than depend upon this or the other single effort.

I am sure the intelligent reader who gives these matters thought and reflection will readily see that from my position we have in tuberculin only an additional aid in our battle with tuberculosis; one, however, that needs the greatest care and circumspection in its proper use, and that, if administered without the necessary safeguards, may become a greater source of evil than of good.

It is, perhaps, unfortunate that I am the director of an institution for tuberculous patients, because my motives in urging treatment of such with or without tuberculin in such establishments whenever possible, could be easily misunderstood; but without such connection my experience could never have been possible, and I could not have been able to learn and appreciate many things that would have passed unobserved but for the close and constant relation with a large number of such patients.

Dr. Trudeau, of Saranac Lake, and others who have under their charge *charitable* institutions in which the number of patients is of no personal advantage to the director, have all arrived at the same conclusions, being as much in favor of the treatment in institutions as I; and interested members of the profession, who now advise tuberculous patients to pursue other courses, can learn the advantages even without establishing institutions of their own, by comparison of the results obtained.

In this connection I may say that I have never been willing to administer tuberculin to patients living outside of my institution, for the reasons already stated, although I have had, and still have, many applicants for such treatment, and could easily have given the time for such routine injections, the fees for which would have been a considerable personal gain. Neither have the charges to patients in my institution been increased, from the beginning to the present time, because of the additional administration of this remedy, although the amount of professional labors with such cases have been thereby enormously increased.

With the subsiding prejudice created, after most extravagant expectations, by its failure to accomplish impossible results, and by its frequently observed injurious effects, clearly demonstrated by me¹ and others to have been the result of the inexperience of those who used it in its early history upon hopelessly advanced cases, in over-doses, and without the essential precautions, the remedy is now once more growing in favor, especially in Germany, and other places where its

real merits are being established by clinical and experimental results.¹ I have had occasion to observe this with prejudiced patients who were admitted to my institution, conditioning that they should not be given tuberculin before it was even proposed to do so. Indeed, there never has been a single patient who, on observing the marked and rapid improvement in other patients receiving the remedy, and the entire absence of any discomfort from its use, did not, without recommendation on my part, ask for its administration, and repeatedly beg for it, when, in my judgment, its use was contra-indicated or unnecessary.

In view of this revival of confidence, I sincerely hope that I may have contributed my share to its clinical understanding, and that my experience with tuberculin may serve other members of the profession sufficiently, so that no sentiment or other motive will be allowed to interfere in withholding the remedy from unsuitable cases, or in adopting its administration with any less precaution than I have found essential.

NASO-PHARYNGEAL STENOSIS.²

BY WILLIAM C. BRAISLIN, M.D.,
ATTENDING PHYSICIAN, LONG ISLAND COLLEGE HOSPITAL DISPENSARY,
ETC., OF BROOKLYN, NEW YORK.

By pharyngeal stenosis is meant any of the states in which the membrane is thickened, so that it encroaches to any extent on the normal caliber of the pharyngeal space, be the thickening of the membrane caused by chronic engorgement of its vascular supply, hypertrophy of its glandular tissue, or deposits of inflammatory products within its structure proper. There is no practitioner, especially in our seaboard cities or towns, that does not come in almost daily contact with these cases. Their extreme prevalence, however, does not tend to make their average treatment meet with the measure of success that is desirable. The result of this non-success on the part of the general practitioner is to send great numbers of cases into the hands of the specialist.

The specialist must always be dependent on his confrères in the wider field of general practice for a large portion of his work; yet it would seem that referred cases should properly consist of that rather small proportion that requires special technique in operative procedures for its relief; and certainly a great many cases come to the specialist that can be relieved, if not cured, by some simple methods rightly applied.

¹ Southern Medical Record, September, 1891; Deutsche med. Wochenschrift, November 19, 1891; Medical World, December, 1891.

² Read at a meeting of the Long Island Medical Society, November 5, 1891.

¹ Weekly Medical Review, August 22, 1891.

It may be useless, but it is more accurate, to define the naso-pharyngeal cavity as that space (entirely out of direct vision), the lower boundary of which is on a level with the free border of the soft palate; the upper boundary of which is limited by the basilar portion of the occipital bone and body of the sphenoid bone; the posterior limit of which is the vertebral column and muscles; the lateral boundaries of which are the pharyngeal constrictors and other muscles of the neck. This space opens anteriorly into the posterior nares, and faces the posterior border of the septum and extremities of the turbinated bodies. This space provides a passage for the air on its way to the lungs through the nose. It contains a great quantity of glandular tissue, which moistens to some extent the air so inspired. During the process of deglutition this glandular tissue is excited, its ordinary secretion is increased in amount, and lubricates the mucous membrane of this portion of the alimentary tract with viscid mucus. The naso-pharyngeal cavity thus belongs, in a specialized sense, to the alimentary tract, and, in a general way, is part of the respiratory tract. Its disorders thus become a source of considerable importance in their bearing on both normal respiration and normal digestion. It is thus easy to appreciate how, conversely, conditions of abnormal quality, density, etc., of air impinging upon its walls, and also conditions of gastric derangement, most profoundly affect this cavity.

The practical importance of a narrowing of this very important section of the respiratory tract is at once rendered clear by considering for a moment the mechanism of respiration.

The chest is practically a *cylinder* for the reception of air necessary for oxygenating blood; the diaphragm, a piston; the nasal canal, part of the tube of normal communication with the air outside. If we give such a motion to the piston as shall increase the inter-cylindrical space, the inter-cylindrical pressure will decrease in direct proportion to the rapidity of the motion of the piston, and in direct proportion to the size of the conducting tube. In other words, while the increase of inter-cylindrical space is constant, the smaller the conducting tube the less the atmospheric pressure in the cylinder; and the larger the canal the nearer the inter-cylindrical pressure will approach the outside atmospheric pressure. Consequently, when we have the caliber of the nasal canal narrowed, the motion of the diaphragm produces a condition of the inter-respiratory air, now less than its normal density, then greater than its normal density. In other words, it produces an alternate rarefaction and condensation of the inter-respiratory air.

This damaging influence, affecting first the glandular apparatus of the pharynx, has more effect on the

whole surface of the respiratory mucous membrane than I think we are at first inclined to believe. The constant change of pressure produces first a tendency to congestion of the whole of the mucous membrane, and it also acts as an excitant to the glandular secreting apparatus. The former tends to a thickening through subsequent inflammatory deposit; the latter to an hypertrophy of glandular tissue. Thus we get increased secretion of mucus; changes in the voice, as indicated by loss of resonance; tendency to tire easily by thus giving the vocal cords more work to do; consequent hoarseness from resultant congestion of the cords. We also get changes in the hearing (often not noticeable to the patient himself, but demonstrable by the watch-tick or other test), due to partial closure of the pharyngeal opening of the Eustachian tubes by the hypertrophied membrane. A Eustachian catarrh is thus being directly induced by the alteration of lowered and heightened inter-pharyngeal air-pressure.

Aside from the deteriorating effect upon the pharyngeal functions of air of improper density, an improper quality plays an important part. This is forcibly illustrated in the cases of patients who suffer from abnormal secretions of the naso-pharynx while in our seaboard cities, but who are promptly relieved by going to the mountains, although the old symptoms manifest themselves immediately on their return. Hence, conditions of moisture are an aggravating if not a causative factor in these cases. There are doubtless other impalpable and unmeasurable factors in our climate, as, for example, salt spray, marsh gas, dust, etc., which irritate to no small extent the mucous membrane of the respiratory tract.

Treatment largely resolves itself into an appreciation of the causes of the hypertrophies of the naso-pharynx.

As a stricture of the urethra keeps up behind it a chronic inflammation with its relative discharge, so a stenosis of the *nasal passages* acts as a continued source of irritation to the mass of glands in the vault of the pharynx. Each of the many varieties of disorder producing nasal stenosis is, therefore, an exciting or an adjuvant cause for a naso-pharyngitis.

The importance of this fact in the treatment of *all* chronic inflammations of the respiratory tract, it seems to me, cannot be over-estimated. The naso-pharynx, when suffering from a stenosis, either partial, as in chronic congestion, or complete, as in adenoid hypertrophies, presents, with varying proportions, indications for treatment of—first, abnormal secretions; second, improper conveyance of air to, and preparation of air for the lungs.

Conditions of improper conveyance of air, of

improper preparation of air for the lungs, and of abnormal secretion, should be subjected to treatment directed to—first, the abnormal condition of the secreting apparatus; and second, to the stenosis.

Of course, the most common point of narrowing is in the nasal cavity; and while this demands its own treatment, its treatment does not affect the stenotic condition of the pharynx which it has aggravated, or caused. The same is true of any of the other causative factors of pharyngeal stenosis. In fact, it has been a matter of observation by patients that secretions of the pharynx seem to be increased after successful treatment of a nasal stenosis. This error is made simply because the mucus secreted by the hypertrophied glandular tissue of the pharynx is more easily dislodged when the column of air inhaled through the nose is of a greater caliber.

In directing any form of treatment to the naso-pharynx it is, perhaps, useless to emphasize the importance of accurate appreciation of both the *degree* and the *situation* of the stenosis.

One form especially distinguishable is that in which the area of greatest stenosis is situated immediately at the posterior, or pharyngeal, opening of the nares. These cases are, of course, associated with hypertrophy of the nasal mucous membrane.

We have one form of stenosis, once called Thornwaldt's disease, which is associated with the abnormal formation of a cyst-like cavity in the midst of the pharyngeal gland, containing pus or mucus.

The pharyngeal gland (sometimes badly called third tonsil), in its acute as well as in its chronic inflammatory states, is the cause of partial stenosis. The temporary stenosis of acute catarrhal naso-pharyngitis is self-limited. The chronic naso-pharyngitis constantly presents symptoms of a greater or less degree of stenosis.

It is the excessive form of hypertrophy of this glandular tissue, constituting the so-called *adenoid growths*, that is so frequently met with in children.

These different forms of hypertrophy often originate from the diseases of childhood—for example, measles or scarlet fever. They are sometimes congenital. They are commonly concomitants of, or sequelæ to, hypertrophic rhinitis, and present an almost similar condition of the mucous membrane. Hypertrophic rhinitis is usually the result of repeated colds. In these cases the membrane becomes accustomed to a chronic congestion. The normal caliber of the arterioles is increased—at least, the resistance to any increase of arterial pressure is decreased—so that in addition to the deposit of connective tissue we have a condition of the mucous membrane abnormally responsive to a chilling of the body-surface.

Nearly all the *milder* forms of hypertrophy of the pharyngeal membrane result from abnormal conditions of the *nasal* mucous membrane; the air being on this account improperly prepared for respiration, becomes extremely irritating to the pharyngeal membrane, and hence the resulting pharyngitis.

As I have said, in order to proceed intelligently with our treatment, we should have a clear idea of first—the degree of stenosis; and second, the location of the point of greatest encroachment on the caliber of the pharynx. For this acquisition of objective symptoms most of our books on this and kindred topics refer us to our rhinoscopic mirrors. This method is not unattended with difficulty, and this fact alone, I have been more than once convinced, has been the cause of debarring many busy men from anything like a successful *modus operandi* in treating this condition. It is difficult, because the procedure depends so largely on the co-operation of the patient, as almost everyone thus treated requires some training in order to insure success. In most cases the first attempt at posterior rhinoscopy induces an involuntary attack of retching, which is usually sufficient to discourage any further procedure.

This condition of affairs regarding such an important and so commonly affected a portion of the anatomy, I do not consider warranted. We are apt, I think, to forget that we have a method of examination of the pharynx literally at our finger-tips, and one requiring no instrumental assistance whatever. The method I refer to is the simple introduction into the naso-pharynx of the forefinger. There seems to me to be no reason why, when for any reason a direct inspection of the pharynx with the rhinoscopic mirror is impracticable, we should not employ this method in routine practice.

The questions to be decided by our examination are: First, What is the condition of the pharyngeal mucous membrane? and second, Whether there is sufficient room in the pharynx for a proper method of breathing. These points are perfectly ascertainable by this method.

Treatment directed solely to the relief of the stenosis, in the cases depending for their etiology on such stenosis, though absolutely essential, is not sufficient for the removal of the changes once brought about in the glandular structure of the naso-pharynx. We must treat the hypertrophy of the membrane by methods aiming at the relief of such hypertrophy. It will not otherwise tend to a restoration to the normal state. The methods used will, of course, depend upon the degree of tissue-changes, the amount of tissue-thickening, and the position of greatest hypertrophy.

If the membrane is in a condition of constant

hyperemia or of constant congestion, simple applications of mild astringents, in the form of sprays, or of solutions applied with the cotton-holder, will be found effective.

In conditions of severer congestion with considerable thickening, it is necessary to use stronger astringents, in the form of powders, astringent solutions applied with a cotton-holder, or applications of caustics. When the hypertrophy has reached a condition that involves a considerable stenosis, with obstruction to the free passage of air, the removal of some of the superfluous tissue is called for. Here we may use caustics, corrosive acids, or the galvano-cautery, or other instrumental means. When we have the tissue completely filling the cavity, as in the condition called adenoid growths, or when the tissue is soft and easily broken down, it should be removed by instrumental means. Numberless instruments have been devised for this purpose, among the most useful of which I consider the various forms of forceps. These are constructed with a view to tearing away, rather than cutting the tissue. Some authorities consider them on this account rather unsurgical. The tissue is so soft, however, especially when of the adenoid variety, that forceps are well adapted to this purpose. There is less bleeding, too, than when a sharp-bladed instrument is used. The various curettes, manipulated either through the nose or the mouth, are exceedingly useful. When the hypertrophies exist around, or just within, the orifice of the posterior nares, the snare is especially useful.

No better instrument has been devised, I believe, for these soft masses than the fore-finger of the right hand, when the nail is sufficiently strong and sharp. It is especially useful in the cases of children, in which time is such an important factor. While using it no illumination is necessary, as the finger conveys to the operator all desirable information through the sense of touch.

In the cases in which it is desirable to use a caustic, either as a curative measure itself or following an instrumental removal of tissue, I have found acids to answer a useful purpose, especially chromic, nitric, and acetic acids. They are corrosive, however, and must be handled with care. It was with the view of eliminating the possibility of applying them to any other than the desired spot, that I had made a glass *porte-acid*. It is simply a glass tube, about ten inches in length, bent at about an inch and a quarter from its distal extremity, at about a right angle to the direction of its original axis, with a rather short curve. It is flanged at its distal extremity for the last quarter of an inch. Through its canal is passed a wire, the protruding proximal extremity of which is manipulated by the disengaged hand. The distal extremity of the wire is armed

with the corrosive substance, and withdrawn into the flanged extremity of the tube. It is now entirely protected from contact with the tissues, and the instrument can be inserted into the fauces, and carried to the point in the pharynx which it is desired to cauterize. When this is done, one hand holds the instrument in position, and the other hand pushes the wire armed with the caustic against the tissue for the desirable length of time; or, if desired, sweeps over its surface. The wire is again withdrawn, and the instrument removed.

In using nitric or lactic acid, a pledget of cotton, saturated with the pure acid, is used. In using chromic or acetic acid, a few crystals are fused on the end of the wire.

The instrument can be made with an alcohol lamp and a glass tube.

It is of the utmost importance to discover and to remove the *cause* of pharyngeal stenosis in each individual case. This is especially to be emphasized when the cause is *nasal stenosis*, whether this obstruction consists of mucous membrane, bone, or cartilage. These cases, when successfully treated, give us some of the most satisfactory results in this department of surgery.

ANGINA PECTORIS.¹

By HERBERT D. BIXBY, M.D.,
OF GRANDVIEW, ILL.

THE sufferer from angina pectoris is without warning attacked by a sense of oppression in the precordial region, which is rapidly followed by a well-defined, severe pain, radiating over the left chest, sometimes to the right as well, and from the chest to the left shoulder, whence it extends into the arm and rarely into the forearm, and accompanied by a sense of suffocation. The pain may also shoot up the neck. The arm seems to be of enormous weight, and there is severe pain upon movement. No position in which it may be placed gives relief, while there is a disposition to relax the affected side by an inclination of the body. The face is pale, the features expressive of intense anguish. Respiration is restrained, for movement of the chest wall intensifies the agony; and the heart is either slowed or beats irregularly. The patient attempts to assume a position that will relax the muscles of the thorax and arm, and may either take a sitting or standing posture, being careful, however, to secure support.

Patients are not talkative during a paroxysm, every inspiration required in the act of conversation

¹ Read at the forty-fourth annual meeting of the Æsculapius Society of the Wabash Valley, held at Paris, Ill., October, 1890. Dr. Bixby was for many years a victim of organic heart-disease and a sufferer from frequent attacks of angina pectoris. He died October 31, 1891.

being accompanied by an acute pang. All movements or jars increase suffering and there is often a strange sensation as of approaching death.

These symptoms, though passing rapidly, sometimes not lasting more than a few moments, may be likened to the slow and easy motion of a train of cars as it leaves a station, but at each second adding to its momentum and intensity, until it is rushing along at reckless speed, pounding, racking, and tearing along, until the patient dreads the next move and fears instant destruction—then, by the same imperceptible change there is a gliding, easy slackening of signs and soon the countenance itself clears a little, and with a sigh of relief he feels well. Such is the course of symptoms in a well-developed paroxysm. The symptoms may vary; the arm may not suffer; the paroxysm may be so mild as to be almost disregarded.

What is it? For years that question has been asked, and as yet it is practically unanswered. The diversity of opinion as to the nature of the affection is illustrated by the number of names that have been given it, twenty-four in all, based upon phenomena that seemed to be characteristic. The common name, angina pectoris, is as unmeaning as any.

From a clinical standpoint there seems but little if any advantage in considering the affection under the two forms, true angina pectoris (in which there is disease of the heart) and false angina (in which there is no recognized heart-lesion). I might say that no clinical distinction can be determined; and the pathology of the disorder is at best uncertain. It is true that in some cases in which death has occurred, in one, ossified or obliterated coronary arteries have been found; in another, fatty degeneration of the heart; and in another, some other morbid condition; but similar lesions are found in cases in which there had never been attacks of angina. The affection has been considered as a neuralgia, but pure and simple neuralgia it cannot be; for while neuralgia is strictly a nerve-pain (and pain enough there is in angina), the pain is so different from the indescribable, agonizing sensations of angina pectoris that the latter must be looked upon as a neurosis; and here we have a clear, decided statement that we are lost. So we accept the neuroses as the category into which angina pectoris falls, and qualify it further by the prefix vasomotor. Some writers prefer to call the disorder angina pectoris when there is recognized organic heart-disease, but under all other circumstances to call it simply a neurosis. This seems like a distinction without a difference, for with or without heart-trouble the affection is a neurosis, the heart-trouble having no clinical significance.

The pallid skin, indicative of disturbed circulation, the slowed or irregular heart's action, accom-

panied by pain in the thoracic respiratory muscles, seem to point more surely to a centrally impeded or deranged innervation affecting the capillaries than to organic heart-disease. With this conception we can understand why the symptomatic phenomena may be irregularly produced, one part affected and another not, accordingly as a greater or smaller number of vasomotor nerve-centers is disturbed. We also find that angina pectoris may result from organic or functional irritation of the terminal filaments of the pneumogastric nerve supplying the heart, lungs, liver, stomach, or intestines, the sense-impressions being conveyed to its nucleus in the medulla and communicated to the vasomotor nuclei. The vasomotor centers being distributed throughout the cord, as well as in the medulla, are irritated, whether from nutritive defect or otherwise, the direct cause being conjectural; the capillaries of those parts or organs from which the disturbance emanates are contracted; the blood-pressure is increased and the circulation is diminished, as indicated by the visible signs. The disturbance of circulation cries for relief, and the excruciating pain becomes a landmark for the location of the organs involved, and furnishes indications for treatment during the paroxysm, as well as in the intervals between paroxysms.

The means at hand for treating the spasm can now be plainly indicated: Ether, chloroform, morphine hypodermatically, and amyl nitrite. Of these, morphine and the nitrite are preëminently the best. Of the latter, from two to five drops may be given by inhalation. Amyl nitrite is rapid in action, stimulating the vaso-dilator centers and causing a flush to appear. With the reëstablishment of the capillary equilibrium, the symptoms of the paroxysm subside. It must, however, be remembered, that the nitrite affects the entire vaso-dilator system (especially that controlling the head), and by increasing the circulation in other parts, arm and extremities, sometimes causes a disagreeable sensation of fullness. It is therefore a remedy that must be used with circumspection. If confided to the patient, only a few doses should be prescribed and these with written cautions.

Many of the attacks are so short that the paroxysm may pass before medicinal treatment can be employed. As the spasms are, sooner or later, likely to recur, the case should be under persistent and prolonged treatment during the interval. Should the attack be concurrent with cardiac lesions these should receive due attention and be treated as they would under other conditions; nevertheless a general course of nerve-tonics and such other judicious medication as may be called for will prove satisfactory both to patient and practitioner. It is especially in the form designated false angina that we

may hope for some permanent good from treatment. This condition is mostly found in those of neurotic tendencies, of rapid growth, poorly nourished, or suffering from gastralgia, enteralgia, indigestion, hyperemia and torpidity of the liver. Let us not ignore these cases, but remember that the nerve is simply the means by which the existence of peripheral disorder is communicated to the central organ—the brain.

For the treatment during the interval, arsenic holds a position to the general condition similar to that of amyl nitrite during the paroxysm. For all neuroses, in fact whenever a nerve-tonic is called for, arsenic is a remarkable remedy; but as in the case of the nitrite, it must be used discriminatingly. In some unknown way, arsenic greatly assists the nutritive processes. According to circumstances, iron, nux vomica and the phosphates, given alternately or with arsenic, may be found necessary.

ORIGINAL LECTURE.

AMPUTATION AT THE HIP-JOINT BY WYETH'S METHOD.

A Clinical Lecture delivered at the Jefferson Medical College Hospital, February 3, 1892.

BY W. W. KEEN, M.D.,

PROFESSOR OF THE PRINCIPLES OF SURGERY AND OF CLINICAL SURGERY
IN JEFFERSON MEDICAL COLLEGE, PHILADELPHIA.

GENTLEMEN: The operation that I have to do before you to-day is a very rare one. The surgical members of the Faculty of this College have performed only five operations of this kind, but these five have been remarkable in one respect. The late Professor Joseph Pancoast did two amputations at the hip-joint; the first one was done at the Pennsylvania Hospital in the earlier part of 1860—just before I began the study of medicine—and in this case, for the first time, he adopted the method of preventing hemorrhage by an abdominal or aortic tourniquet; the case recovered. His second case was done in 1865, in the old College building, and also recovered. The late Professor Samuel D. Gross first operated in 1862, at the Philadelphia Hospital—an operation that I had the pleasure of seeing; his second was performed in 1865, and his third, in this amphitheater, in 1879; all three recovered. You observe, therefore, the remarkable fact that my surgical predecessors have done five amputations at the hip-joint with five recoveries. It must be remembered, also, that these operations were in the pre-antiseptic days, and that the mortality of hip-joint amputation varies from 40 to 93 per cent. It is, I hope, a happy augury for the result in this case. Let me now give you the history of the patient:

Mrs. T., thirty years of age; residence, Bahia, Brazil; entered the Jefferson Hospital January 19, 1892. She was born in Texas, the family history being good. A brother was never very rugged, but has no organic trouble. At nine years of age the patient had her right

arm fractured above the elbow, with injury of the musculo-spiral nerve; this produced wrist-drop that has never passed away, and the muscles of the arm are wasted. She had whooping-cough at thirteen, which left her with a bad cough for five or six years. Her greatest weight was 106 pounds, and she now weighs 101 pounds. Her height is five feet two inches. She married at twenty, and immediately went to Brazil as a missionary, since which time she has never been very strong. She has had three living children, and one miscarriage at three months. Two years ago she had a severe attack of smallpox, and, while recovering, an abscess formed at the seat of the old fracture of the arm.

Her present trouble commenced about seventeen months ago. At that time, while pregnant with her last child, both legs swelled, the left much more than the right. A great deal of pain accompanied the swelling. The pain and swelling diminished after the birth of her child, but there remained a lump in the left popliteal space. In May, 1891, this began to be very painful, the pain being sharp and shooting in character. Soon after this the tumor also began to increase in size until it now extends from the top of the calf nearly to the groin. In



Brazil she consulted both native and English physicians, and they decided that amputation at the hip-joint was the only possible means of relief, and advised her to come to the United States to have it done. Her health has improved on the voyage from Brazil. She arrived in this country only a few days ago. A slight systolic cardiac murmur is heard over the base of the heart. The tumor measures twelve and five-tenths inches in length, and the circumference of the lower part of the thigh is twenty-three inches. The lymphatics in the groin are not enlarged. The pains are now dull in character and not as severe as they have been. Her digestion is good. She is, unfortunately, five months pregnant.

Having now given you the history of her case, so soon as the patient is brought in you will observe that the tumor extends well up toward the hip, but that there is still room for a flap between the tumor and the joint. You would naturally, therefore, ask me, Why not spare her the more severe operation of amputation at the hip-joint itself and amputate at the junction of the upper and middle thirds of the thigh? My answer is this: The tumor is undoubtedly a sarcoma. I fear that it has

originated from the bone or its periosteum—an osteo-sarcoma—and if so, the probabilities are that the entire bone is infected, and, therefore, to leave the upper portion of it would be, in all probability, to leave a source of infection from which the disease would start anew and destroy her life. Even if the bone is not involved, the soft parts are infiltrated so high up that there is not room for flaps of undoubtedly healthy tissue for a thigh amputation; hence the operation must be at the hip-joint or not at all. I am very loth to do any operation at all, the danger is so great. In addition to that, in this special case her present pregnancy creates so large an additional percentage of danger that I would gladly do no operation.

The question will then naturally suggest itself to you, Why not wait until after her confinement? or, Why not induce premature labor? As to the first: It would be necessary to wait four months for the completion of her normal term of pregnancy and at least one month for the puerperal period to pass. These five months might be cut down to four, possibly, by inducing premature labor at the eighth month; but not only do we not know what her condition might be after labor, whether premature or at term, but the disease, in all probability, in from four to five months from now would be so far advanced that I should then decline to do any operation. To induce labor now and to wait for a month to pass would be a possibility; but, inasmuch as we are not at all certain that she will abort after the amputation, I think we are justified in trying to save the lives of both mother and child; moreover, this is her own strong desire. Abortion will depend chiefly upon whether the operation can be made aseptic. If sepsis follows, abortion will almost surely occur; but if the wound runs an aseptic course, I think we shall probably avoid this calamity.

The reasons for amputation at the hip are twofold: First, traumatism; secondly, some new-growth—especially osteo-sarcoma. Occasionally other causes exist, but practically the traumatism and these pathologic causes cover more than nine-tenths of the cases. The dangers of the operation are threefold: First, and foremost, hemorrhage; secondly, shock; and thirdly, the later danger of sepsis, with all its complications. These are especially prone to follow operation at the hip-joint, on account of the lowered vitality of the system after operation, the enormous surface that is exposed, and the difficulty of preventing infection from the urine and feces.

I. The means by which hemorrhage is met are varied. First, the older methods of ligating the superficial and deep femoral arteries and veins prior to amputation; or compression of the abdominal aorta, which, as I have told you, was first devised and done by my predecessor, Professor Joseph Pancoast. Both of these, however, have great disadvantages. Ligation of the femoral vessels obviates hemorrhage from these vessels in the anterior flap, but it does not at all control hemorrhage from the gluteal, the sciatic, the obturator, and the circumflex and numerous muscular branches in the posterior flap. Compression of the aorta exposes the patient to dangerous pressure on the solar plexus or on the viscera, and, in addition, in our present case, is absolutely ruled out by her pregnancy.

Secondly, a few years ago Dr. Frank Woodbury,¹ a graduate of this school, proposed to insert the hand into the rectum and compress the common iliac artery. Soon afterward Van Buren, of New York, repeated the proposition. This, I believe, has never been done; but it possibly suggested a mechanical means which has answered a good purpose in several cases—Davies's lever. This English surgeon, following out the same idea, proposed to use a long, well-rounded, and smooth ebony stick, which might be compared to a couple of feet of broomstick. This was inserted in the rectum, and by lifting the handle, the other end being over the common iliac artery, this vessel could be compressed. Injury to the rectum, however, and the want of absolute reliability have caused this method to be viewed with only moderate favor.

Thirdly, the Furneaux-Jordan method. A compress is laid over the external iliac artery just above Poupart's ligament, and a band of elastic tubing is passed between the thighs, carried inside the tuberosity of the ischium below and within the crest of the ilium above. When the tubing is drawn sufficiently tight it arrests the pulsation in the external iliac artery by its pressure. I have tested this method repeatedly on the living model, and I confess that it has not given me any satisfaction; I have had great difficulty in controlling the artery.

Fourthly, Trendelenburg proposed to pass a stout pin under the femoral vessels and compress them by an elastic tube wound around the two extremities of the pin in a figure-of-eight.

You will notice that all these methods were open to one of two objections: if they arrested the blood both in the anterior and posterior parts of the thigh, they were objectionable on mechanical grounds by reason of the possible injury to the solar plexus, the intestines, or the rectum; or if they compressed the vessels in the anterior flap alone (the external iliac or the femoral), they were objectionable because of the great hemorrhage from the posterior flap. It was reserved for an American surgeon—a gentleman who has done me the honor to come from New York and be present at the operation to-day—Professor John A. Wyeth, to devise what is undoubtedly the best method, and, in fact, what I think we may call now the only method of hemostasis in amputation at the hip-joint. In addition to these methods of preventing hemorrhage, Erskine Mason proposed that, as far as possible, we should save the blood that is in the leg by Esmarch's bandage. In some cases the entire limb can be Esmarched from the toe to the groin, but in our present case it will not do to apply the Esmarch bandage higher than the lower border of the tumor, otherwise some of the sarcomatous elements might be driven into the circulation. Wyeth's operation is done as follows:

Two stout pins, twelve inches long and one-quarter of an inch in diameter at the head, are passed through the upper part of the thigh. The object of these pins is to hold in place a piece of elastic tubing which is wound tightly around the thigh just above them; the tubing will constrict all the bloodvessels in the entire thigh, and is prevented from slipping down by means of the pins.

¹ The American Journal of the Medical Sciences, January, 1874, p. 131.

The exact place of the pins is not very important, but they must be passed through the tissues at points where they will not injure any large vessels or nerves. The first one is passed about one and one-half inches below the anterior superior spine and slightly to its inner side and emerges just back of the trochanter major. The second one is passed an inch below the spine of the pubes internally to the saphenous opening and emerges just in front of the tuberosity of the ischium. Elastic tubing, half an inch in diameter, is then wound five or six times around the thigh, and is secured by stout forceps, or, better, by tying it. This tubing should not be ordinary white-rubber tubing, which is not very elastic, but should be of pure rubber. The control of the hemorrhage by this method, as you will see, must be absolute. Do not make one mistake: when I make the circular amputation you will see a large amount of blood flow out, but this will be wholly from the leg and not from the trunk; so soon as this has escaped the hemorrhage will entirely cease. About five inches below Poupart's ligament a circular incision is made through the skin and the superficial fascia; this is then dissected back, as a cuff, until the level of the lesser trochanter is reached; the muscles are then divided circularly down to the bone, and the bone is sawn off. Dr. Wyeth has made the happy suggestion that, when the bone is bare, instead of dividing it at the same level as the muscles, the tissue be stripped down for several inches and the bone sawn much lower down; the protruding part of the bone then serves as a handle for manipulation. This is far superior to sawing the bone at the lesser trochanter and seizing the stump of the bone with the lion-jawed or other forceps.

The next step is to secure the bloodvessels. The principal ones will be the superficial and deep femoral arteries and veins, in front, just under the deep fascia. Posterior to the bone, along with the sciatic nerve, run the sciatic vessels; externally, toward the gluteal region, the gluteal vessels, and lower down, the circumflex. Internally, at about the middle or a little posteriorly, lies the obturator. Besides these there is a large number of muscular branches which cannot be found until the elastic tubing is gradually loosened, after the important vessels have been secured. The vessels being all tied, even down to the smallest spouting branches in the muscular tissue, the elastic tubing, which has been partially released, is now removed and the pins drawn out. The upper portion of the femur is then dissected loose from the soft parts, hugging the bone as closely as possible, so as to avoid dividing any large vessels. The muscles are then cut loose from the trochanters, and the capsule of the hip-joint is exposed and opened. The ligamentum teres is now severed and the entire upper extremities of the bone removed.

II. The second danger, as I have mentioned, is *shock*. This is met in several ways. First, our patient has had an ounce of brandy and one-twentieth of a grain of strychnine. Secondly, I shall operate, as you observe, with the patient in a Trendelenburg chair; by means of this I can at any moment not only keep the patient horizontal, but, if I choose, I can put the head lower than the hips at the touch of a spring. Thirdly, in any serious operation the chilling of the patient from the necessary exposure of the person becomes a matter of great

moment; especially is this true in an amputation so high up as the hip-joint. Accordingly, I have had both of my patient's arms, the right leg, and the entire body well wrapped in a thick layer of raw cotton kept in place by bandages. This is particularly necessary in using Trendelenburg's chair, which is narrow and cannot accommodate any hot-water bottles or other means of artificial heat. Fourthly, I have digitalis, the galvanic battery, and hot enemata all ready for use should they be required. In spite of all these, however, the shock must be severe. One cannot remove nearly one-fifth of the entire body without it.

III. The third danger is *sepsis*. I can dismiss this in a very few words. The leg, the buttock, and the abdomen have all been prepared as is usual in all my operations. This has been done for two days in succession, in order to obtain absolute asepsis. Secondly, the bowels have been opened gently and the rectum washed by an enema of warm water. Thirdly, the vagina has been disinfected by a douche of bichloride of mercury (1:2000), followed by hot water, and, to avoid a sudden possible opening of the bowels or any vaginal infection, an antiseptic towel has been secured over the vulva.

The patient is now on the chair; an aseptic sheet is under her, another one over her body, and a third envelops the right leg, which will be held by one of the clinical assistants. The steps of the operation are followed precisely as I have given them to you.

The operation being completed, let me say a few words in reference to it. The wrapping of the person of the patient in cotton is, I think, a matter of a great deal of importance in preserving the body-heat. It is very evident that she has not suffered nearly so much from shock as she otherwise would have done. I have operated as quickly as I could consistently with thoroughness. No operation must be done so quickly that it is done badly; but if done well, the more quickly it is done the better. You have seen, however, that the operation has taken fifty minutes. Two steps caused delay: first, the separation of the soft parts from the bone, and secondly, the ligation of the numerous vessels. In any other case I should not separate the soft parts, as I did here, by a knife. I should prefer the scissors, which, to a certain extent, would crush the small vessels; or, still better, I should be disposed to strip up the periosteum, in order to avoid the numerous small vessels which have taken so much time both in finding and ligating. Of course, at the linea aspera the tissues must be divided by the knife or scissors. One vessel, you especially noticed, was troublesome. It lay just outside the capsule in a wound of great depth, and was difficult to find and seize separately from the capsule. Should I ever have occasion to amputate at the hip again I should undoubtedly prefer to slit up the soft parts on the inside if need be, or if dividing the muscular tissues about the great trochanter gave trouble, to slit them at the outside—these additional incisions practically counting for nothing in healing and for much in facility of dealing with hemorrhage or with the muscles.

I cannot express too high an opinion of Dr. Wyeth's method of primary hemostasis. Not one drop of blood was lost from the trunk until after the large vessels were secured. On relaxing the compression of the tubing, of course, a large number of vessels required ligation, and

then after removal of the bone quite a number more, so that thirty-three ligatures in all were required. This large number was probably due to the great vascularity of the thigh, as the tumor required a large amount of blood for its growth. I think it probable that the patient lost about from eight to ten ounces of blood during the later securing of the vessels and enucleation of the bone. Dr. Wyeth's idea of a low amputation of the bone is a very happy one, the bony handle being very satisfactory. Whether the stripping up of the periosteum from the bone in order to separate the soft parts with less hemorrhage would be a source of danger has occurred to me. I shall ask my assistant, Dr. Coplin, to examine the periosteum of the upper part of this bone in order to determine whether there is any sarcomatous infiltration. If there is, it precludes at once the propriety of stripping up the periosteum.

If there is no sign of any such infiltration, the stripping up of the periosteum would not only avoid the danger by diminishing the hemorrhage, but would also have the possible advantage that in this partially complete periosteal tube there may be developed a more or less tough and resisting substitute for bone, which may make the wearing of an artificial limb less irksome. In most hip-joint amputations, an artificial leg can be worn only for a few hours each day, the rest of the time patient going about on crutches.

Two drainage-tubes have been placed in the wound, you notice, at both the external and internal extremities of it, both reaching up to the acetabulum. In a wound of such enormous surface and so very deep as this, drainage is essential, but the tubes may be removed at the end of two or three days, so that no sinus will remain and no avenue of deep infection exist.

The mortality of amputation at the hip-joint is very great. It is, perhaps, the gravest operation in all surgery. You will find in the *International Encyclopedia of Surgery* (i, 684) a table, prepared by a former assistant of mine, Dr. F. C. Sheppard, which contains the largest number of cases ever gathered together, 633 in number. Let me give you simply three summaries: First, in military surgery there were 238 cases of hip-joint amputations, with an average mortality of 87 per cent. Among these, primary and intermediate operations give the frightful mortality of 93 per cent.—only 7 out of 100 recovered! Amputation at the hip, therefore, during a campaign is almost equivalent to a death-warrant.

Secondly, in civil practice, after traumatism, including gunshot wounds, there were 71 cases, but the death-rate fell at once to 66 per cent. by reason of the better care and earlier attention and the absence of the hardships and privations inevitable during war.

Thirdly, and more encouragingly, there were 276 cases of amputation for pathologic causes, with an average mortality of 40 per cent. At best you see, therefore, our patient has to face a terrible risk, and, in view of her pregnancy, an exceptionally large risk.

March 10, 1892. The night after the operation, for about forty-eight hours, the patient suffered from traumatic delirium, although her temperature only rose to 100.8°. With this delirium she entirely lost control of the bladder. The greatest care was taken to prevent, if possible, infection of the wound by the urine. The

inner drainage-tube was removed on the second day. No general infection took place, but by the end of the third day some pus showed itself in the track of the inner drainage-tube and infected the outer one soon afterward. The outer one was retained for several days—first, on account of a very abundant serous oozing, and later on account of the local suppuration. There was not, however, any general infection, and the temperature never rose to 100° after the first twenty-four hours. The flaps united excellently, except in the track of the drainage-tubes.

At no time was there the least indication of any disturbance of her pregnancy. This I attribute to the absence of general septic infection; had it taken place I have no doubt that abortion would have followed the high fever and general constitutional disturbance that would have attended it.

For the first forty-eight hours especially, the pain was very severe in the amputated leg, particularly in the foot-sole, and morphine in small doses was required to relieve it. The phantom leg was raised from the bed and held suspended in the air. Removal of the sutures seemed to increase its apparent reality, and up to the present time (March, 1892) the leg remains still as vivid as before. The position of the leg at present varies somewhat with the position of the stump. It is always, however, to some extent in advance of the stump—e.g., when she is lying upon the bed it is a little above the bed. Usually the knee is bent, and the knee itself has been rather vividly perceived. Within the last week or ten days the leg has begun to shorten—not that the foot is attached, for instance, to the middle of the calf, but the entire leg seems to be shortening in its length. The pain is still felt occasionally in the foot-sole and sometimes shoots up from the lost foot to the stump.

Should I have occasion to repeat the operation, I should certainly use but one drain, placing that externally to avoid the possibility of infection.

MEDICAL PROGRESS.

Successful Operation for Cerebral Abscess.—MURRAY (*British Medical Journal*, No. 1624, p. 333) has reported the case of a girl, five years old, who, fourteen days after having been struck by a poker upon the right side of the head, presented uncontrollable twitching of the left arm and left side of the face. The movements continued for half an hour without loss of consciousness. Two other like attacks occurred on the same day and another subsequently. The seizures began with shaking of the left arm, followed by movements of the fingers; then the left side of the face became involved and the eyes rolled about. Progressive loss of power in the left hand was observed after the first attack. The hand became extended at the metacarpo-phalangeal joints and flexed at the interphalangeal joints. Sensation was unimpaired. The temperature was 98°. A small, sloughing scalp-wound was found in the right parietal region, in a situation corresponding with the junction of the upper and middle thirds of the fissure of Rolando. Through this wound a probe could be passed into the cranial cavity. Operation having been decided upon, a three-quarters inch disc of bone was removed at the site

of the wound. The dura mater was found to be torn; the cerebral structure was soft and sloughing and without pulsation. A probe introduced entered an abscess-cavity from which a dram of viscid pus was evacuated. The cavity was irrigated with a 1:5000 mercuric chloride solution; a small piece of sloughing tissue was removed, and a drainage-tube was introduced. Pulsation became evident at the end of a week. At the end of two weeks the drainage-tube had by gradations been entirely removed. The seizures did not recur. Power returned to the left arm and hand. Bilateral optic neuritis was discovered, but this subsequently disappeared.

The Non-contagiousness of Leprosy.—In a communication to the *New York Medical Record*, No. 1113, p. 276, DR. L. DUNCAN BULKLEY presented the following conclusions concerning leprosy, based upon considerable observation:

1. There is no warrant for the popular terror surrounding the name of "leprosy" as a disease.
2. The disease is not contagious in the ordinary acceptance of the term, as applied to such diseases as smallpox, scarlatina, or syphilis.
3. Leprosy is probably due to the presence of a bacillus.
4. There is strong reason to suspect that it may first be introduced into the system by the way of food, and fish is the most likely of all substances to furnish and convey the poison.
5. There is evidence that when acquired, the disease may, under favorable conditions, be transferred from one person to another.
6. Heredity probably accounts for a share of the cases, but the disease is not necessarily transmitted by inheritance.
7. Inoculation with leprosy matter may be the means of conveying the disease, when all the conditions are favorable.
8. There are far more and greater reasons for the restriction of syphilis and tuberculosis by isolation and segregation than for the necessity of these regulations in regard to leprosy.

Poisoning by Balsam of Peru.—LOHAUS (*Berliner klin. Wochenschr.*, No. 6, 1892, p. 130) has recorded the case of an infant, six days old, to see which he was called on account of convulsions. He found the child covered with sweat, crying, and evidently in great distress. On inquiry, it was learned that the infant was nursed by its mother, but that the stools were not normal. They were thin, greenish, and contained mucus. The child was restless and refused to take the breast. On the following day it was quieter, but moaned. The skin was wet; the lips were cyanotic; from the mouth exuded brownish, viscid mucus, with a peculiar ethereal odor. The pulse was rapid and feeble; the pupils were small. On investigation, it was elicited that the mother had been making applications of balsam of Peru to the nipples to prevent the development of fissures, simply wiping the nipples prior to nursing. In consequence, the infant got a small quantity of balsam of Peru at each nursing. As it became restless, the frequency of application to the breast was increased. The symptoms grew progressively worse, and the child died. An autopsy was not permitted, but it is believed that the

balsam taken with the nourishment gave rise to at least to an intense gastro-intestinal catarrh.

Linear Craniotomy.—At a meeting of the French Academy of Medicine, PRENGRUEBER (*Münchener medicin. Wochenschr.*, No. 5, 1892, p. 80) reported the successful performance of linear craniotomy in a case of simple idiocy in a boy nine years old, without morbid hereditary predisposition, in whom development was retarded after the eighteenth month of age, the child learning to walk only at three, being filthy, and unable to read or write, and behaving like one of three or four. The cranium, elongated vertically, presented an elevation in the course of the fronto-parietal suture. The frontal and parietal fossæ were entirely obliterated. The cranium was asymmetrical, the left side being less well developed than the right. A strip of bone, a little more than an inch wide and about four inches long, was removed from the left side of the cranium about an inch from, and parallel with, the sagittal suture. Corresponding to the elevation at the fronto-parietal suture a thickening of the bone, directed inward, was found exerting pressure upon the brain. The offending structure was removed. The primary result was most satisfactory. Too little time had elapsed to warrant any opinion as to the ultimate result.

Attenuation of Tubercle-bacilli.—Failing in attempts to inoculate hens with tubercle-bacilli obtained from man, GRAMATTSCHIKOFF (*Centralbl. f. allgem. Pathol. u. patholog. Anat.*, 1892, ii, No. 25, p. 1057) sought to determine the nature of the changes that took place in the bacilli when introduced into the organism of hens. With this end in view, he introduced into the peritoneal cavities of hens pure cultures of tubercle-bacilli contained in parchment paper, in animal membranes, or in glass tubes closed by permeable membranes. The paper, membranes, or tubes, were removed after variable intervals, and the contained bacilli cultivated upon glycerin-agar and introduced into the eyes of rabbits. By this means it was possible to obtain tubercle-bacilli, of which the virulence was attenuated in a degree corresponding to their length of residence in the organism of the hen. Some were still capable of inducing a general tuberculosis, but the process pursued a slower course than usual. In others, only a local lesion developed, and this underwent spontaneous cure.

Gunshot Injuries of the Spinal Cord.—VINCENT (*Revue de Chirurgie*, No. 2, 1892, p. 89) has recorded three cases of gunshot wound of the spinal cord treated by trephining, of which two terminated fatally. From a study of these and of thirty other cases collected from various sources, he expresses the view that while such injuries are unquestionably grave, they are not necessarily fatal. There is evidence that in some cases surgical intervention has contributed to the successful issue. If the lesion involve the spinal column on its posterior or lateral aspects, in an accessible situation, and there be no visceral lesion, abdominal or thoracic, imperilling life, the wound should be exposed throughout its extent, to determine the character of the injury, to remove foreign matters capable of causing compression or irritation of the cord, and if necessary to trephine the

spinal column. In some cases the operation may prove futile, but aseptically performed it is innocuous.

Cystoscopy.—From a consideration of the subject of cystoscopy, MEYER (*N. Y. Medical Journal*, No. 689, p. 174) concludes that the procedure should be practised in all obscure conditions of the bladder or kidneys, before operative interference is resorted to. Certain conditions render cystoscopy impracticable. The manipulation is simple and harmless, though its successful execution requires experience. It should be employed after all other means of diagnosis have been exhausted. It seems probable that in the future it will be possible to catheterize the ureters, so that the urine of each kidney may be separately examined. By observation the relative work done by either kidney may be approximately determined. The operating cystoscope may afford the means of therapeutic application under direct observation.

Transmission of Tuberculosis by the Seminal Fluid.—At a meeting of the Society of Anatomy and Physiology of Bordeaux, SOLLES (*Journal de Médecine de Bordeaux*, 1892, No. 5, p. 52) reported the results of experimental inoculation of two guinea-pigs, the one with the fluid expressed from the testicle of a tuberculous subject, and the other with the spermatic fluid obtained from the seminal vesicle of another tuberculous subject. In the first, the induration at the site of inoculation slowly disappeared, without involvement of adjacent glands, and the animal recovered. In the case of the second guinea-pig, fatal general tuberculosis developed. The evidence, in so far as furnished by a single case, points to the hereditary transmissibility of tuberculosis.

The Transmissibility of Carcinoma.—At a meeting of the Académie des Sciences, DUPLAY and CAZIN (*La Médecine Moderne*, 1892, No. 8, p. 113) reported the results of investigations as to the inoculability of carcinoma. In a first series, comprising twenty-two observations, they inoculated, either subcutaneously into the peritoneum or into the blood, rabbits, guinea-pigs, and dogs, with carcinomatous material obtained from man, in all instances without positive results. In a second series of experiments they inoculated animals with carcinomatous material obtained from dogs, but without producing more than a local inflammatory lesion, which underwent absorption. Attempts to transmit carcinoma from dog to dog also failed.

A Case of Myxedema of Syphilitic Origin.—At a meeting of the Association of Surgeons of Berlin, KÖHLER (*Deutsche medicin. Wochenschr.*, 1892, No. 6, p. 122) reported a case of myxedema in a woman fifty years of age, who likewise presented manifestations of syphilis. Anti-syphilitic treatment was followed by the disappearance of the specific symptoms, as well as of the myxedema. An explanation is sought in a possible syphilitic involvement of the thyroid gland.

Toxicity of the Serum of the Blood in Puerperal Eclampsia.—In two cases of puerperal eclampsia CHAMBRELENT (*La Semaine Méd.*, 1892, No. 12, p. 89) found that the toxicity of the serum of the blood was increased, while

the urotoxic coefficient was diminished. These observations are confirmatory of the view that puerperal eclampsia is dependent upon auto-intoxication.

THERAPEUTIC NOTES.

The Treatment of Cystitis with Mercuric Chloride.—GUYON (*Annal. des Mal. Génito-urinaires*, xi) recommends mercuric chloride in the treatment of cystitis. The results are especially good if the cystitis be tuberculous. Irrigation or instillation may be employed. The mercurial solution may vary from 1 : 5000 to 1 : 1000. At first from twenty to thirty drops are instilled, by means of a syringe, into the prostatic urethra, the quantity being gradually increased to a dram. The bladder must be evacuated after each instillation. In gonorrheal cystitis, good results were obtained from instillations of silver nitrate 1 or 5 : 100.—*Münchener med. Wochenschr.*, 1892, No. 5, p. 81.

Ointment for Sycosis.

R.—Acid. tannic. gr. xxiv.
Sodii lactat. 3j.
Zinci oxidi } aa 3iij.
Amyli }
Vaselini 3j.—M.
Ft. unguent.

S.—Apply twice daily to the skin carefully shaved.
ROSENTHAL, *L'Union Méd.*

Injections of Gray Cerebral Matter in the Treatment of Neurasthenia.—At a meeting of the French Academy of Medicine, PAUL (*L'Abeille Méd.*, 1892, No. 9, p. 65) reported the utility of subcutaneous injections of sterilized emulsions of the gray matter of the brain of the sheep in the treatment of neurasthenic conditions. In eleven cases in which the procedure was employed good results were obtained; the remedy was well borne; the injections occasioned no unpleasant complications.

For Coccydynia.—The following suppository employed at bedtime will afford relief from the pain of coccydynia and permit sleep:

R.—Ext. belladonnæ gr. ¼.
Ext. hyoscyami gr. ¼.
Iodoformi gr. ¼.
Ol. theobromæ gr. xx.—M.
WHITLA.

For the Cough of Acute Bronchitis.

R.—Apomorphinæ hydrochlorat. . . gr. j.
Acid. hydrochloric. dil. m℥x.
Syrup. f3iv.
Aquæ menth. pip. f3jss.—M.
S.—From one-half to one teaspoonful every two hours.
WHITAKER.

For Acute Angina.

R.—Sodium benzoate gr. x.
Tincture of benzoin f3ss.
Infusion of rose leaves f3j.—M.
S.—Use frequently as a gargle.

L'Abeille Méd. [*Cour. Méd.*]

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SATURDAY, MARCH 26, 1892.

THE ETHICS OF PROPRIETARY PREPARATIONS.

THE subject of this article is suggested by a letter from a correspondent written in answer to our own letter declining to publish an article that seemed to us liable to be misunderstood as an advertisement of a certain proprietary preparation. We do not question our correspondent's good faith; but in the belief that he has been misled, and with a desire to save others from being misled as he has been, we shall try to speak plainly on the important issues involved.

For the sake of designating in our argument, without advertising it, a preparation such as our correspondent advocates, we will substitute the word *fraudine* for the name used by our correspondent.

Our correspondent says:

"There is a difference between patent medicines sold to the public, proprietary articles sold to anyone, and antipyrin, aristol, *fraudine*, and similar drugs introduced only to the medical profession, where we are made acquainted with the general character of them, as, for instance, *fraudine* being a coal-tar derivative, and where its discovery is due to the industry of some chemist outside of the medical profession. We surely are but at the beginning of this labor of chemistry, and the only stimulation chemists will have for such tedious work will be the

pecuniary reward resulting not from the fact of the preparation being a secret—that makes one of the points of difference, for anyone can go to the Patent Office and learn the procedure—but from others being prevented from manufacturing the article for a number of years."

There is, we regret to note, considerable confusion and wavering in the minds of many members of the medical profession as to the attitude that should be assumed toward preparations of the classes named by our correspondent. "Medical ethics" rest upon no other foundation than that of ethics in general—the simple principle that there is a distinction between right and wrong. The acts prohibited in the written code adopted by the American Medical Association are not wrong because the code says they shall not be done; but the code says they shall not be done because they are wrong. They were reprehensible before the code was established, and to abolish the written prohibition will not make them commendable. Every honorable man whose state of civilization has advanced far enough to enable him to appreciate the distinctions on which their prohibition was based must, perforce, continue to avoid them.

If we are told that distinctions between right and wrong are hard to draw, we answer that religions, philosophies, and science have, in various language, expressed at least one simple and fundamental guide: That which is selfish is wrong. The good of all, not of one, is to be sought. Despotism in government, monopoly in economics, secrecy in medicine, are children of the same vice.

The physician occupies a unique relation to the public and to his patients. He is trusted with more than their fortunes—with their lives. He must think of their welfare before his own, or rather, find his own welfare in theirs. If he is not prepared to do this, he must not enter the sacred ministry of Hygeia. The thought of gain that might legitimately be entertained by those who labor in any other calling, save alone that of the minister of religion, may not enter the physician's mind. True, "the laborer is worthy of his hire," and the physician, like the pastor, must live; and to live, he must have the wherewithal to procure the necessities of life; and to practise his profession usefully and intelligently, he must have books, instruments, and opportunities for study and research. All this requires money, and therefore, of course, the pastor must receive a salary, and the

physician is obliged to ask compensation for his services from those of his patients who are able to give such compensation. But from the element of profit-seeking that figures so largely in commerce and in some of the arts, the physician, like the pastor, must forever maintain himself purified.

In addition, he owes it as a duty to humanity to promptly make public for the benefit of all sufferers, present and future, any discovery he has made that may tend to throw light upon the causes or processes of disease, or to add to the resources of the profession and the public in preventing and combatting disease.

Furthermore, no useful discovery can be made by a physician at the present day unless he has in his possession knowledge that has come to him from the labors of others, unselfishly given throughout all the long ages of the history of the science and art of medicine. Having received this value from his predecessors and contemporaries, he is bound to return an equivalent to his contemporaries and successors. The knowledge he has been given came from the first, and the knowledge he can give belongs, of right, to the last.

From all these standpoints, therefore, the attempt to hold as secret or exclusive for the purpose of commercial profit, remedies or processes that the discoverer may deem to be more beneficial than those which are the common property of the profession, has always been regarded by the enlightened sentiment of medical men as nothing less than criminal. They cannot conceive that any true physician would be guilty of such a crime. Therefore it is that those who attempt to trade upon the alleged possession of secret processes of cure are regarded as charlatans and impostors. Therefore it is that no man may adopt the methods of charlatans and impostors and dream of retaining the respect or confidence of the profession whose holiest traditions he outrages.

What would the Church say to one who professed to have and to sell the secret of the soul's salvation?

Physicians dare not compromise with fraud; they must hold themselves free from the slightest suspicion of venality. "The greatest good to the greatest number" demands that they shall absolutely refrain from countenancing the secrecy that may envelop an alleged remedy, even by tacitly permitting its use. "To do a great right, do a little wrong"—even could great good follow, which in this instance would be impossible—is the argument

of the special pleader, and of the devil. Much nobler is the sentiment, "If thine eye offend thee, pluck it out."

But even departing from the high ground of principle, and coming down to the very low level of expediency, let us consider whether or not it be expedient for the advancement of science and the promotion of the art of healing to use secret preparations or nostrums as remedies. By a secret preparation or nostrum we understand an alleged remedy, of which either the method of preparation or the true and exact composition is not made public. Quinine, for example, though perhaps prepared by a secret process, is not a nostrum. Neither does antipyrin nor acetanilide, nor thymol-iodide fall within this category. They are definite chemical compounds, and because the process by which one of them is made is in truth patented, it is on record. So-called "patent medicines" are not patented. They could not prove the "novelty" and "usefulness" that the law demands as a prerequisite to the issue of a patent. Their names are "trade-marked" or "copyrighted," but their composition is kept secret. To reveal it would be to reveal their fraudulent pretensions.

"Fraudine," *i. e.*, the drug referred to by our correspondent, concerning which all that is known is the bare assertion of its manufacturers that it is a "coal-tar derivative," is like the ordinary patent medicine in the absence of the necessary publicity involved in a true patent. It therefore falls within the prohibited category of nostrums or secret articles. The bald expression, a "coal-tar derivative," is therapeutically and pharmaceutically meaningless, and is as misleading as the ordinary quack's characterization of his nostrums as "purely vegetable." Strychnine and charcoal are both "purely vegetable," yet their therapeutic and toxic properties lie at the opposite poles of the pharmacologic sphere.

"Coal-tar derivatives" are many and various in composition, as in therapeutic properties and in toxic powers.

Kairin is "a coal-tar derivative," yet no careful physician will employ it in medicine, now that its toxicity has been so abundantly demonstrated. Suppose an enterprising firm of manufacturers, fortifying itself with certificates and reports (alas! so easily purchased), were to mix kairin with a number of inert substances, and put the mixture upon the market as an "American coal-tar deriva-

tive," having antipyretic and analgesic properties; would that justify the physician in prescribing it under the name of "antimorbin," when he would not be justified in prescribing it under its own name? How can he know that a preparation, concerning which neither the composition nor the process of manufacture is anywhere on record (and such is the case with *fraudine*), is not equally dangerous with the mixture we have supposed? As a matter of fact, at least one case of fatal poisoning by this very nostrum that our correspondent so extravagantly praises, is on record.

We have had in the so-called "gleditschine" a notable instance of what the unscrupulousness of manufacturers, presuming on the well-known gullibility of medical men, will lead them to do. Is it less reprehensible to mix acetanilide with sodium bicarbonate, and, while carefully refraining from making known the composition of the mixture, to allege it to be a new product with many wonderful virtues, than it was to mix cocaine and atropine, with the same careful secrecy and the same false allegations?

While, however, we deem it criminal for a physician to hold secret a medical discovery, and incompatible with the highest standard of professional conduct for him to patent a therapeutic invention, we do not and cannot object to a chemist's patenting anything that the laws of his country make patentable. We do not and cannot object to the chemist's entertaining the idea of profit, and laboring to attain large profit by honorable means. We do not and cannot object to the use by physicians of remedies of which the processes of manufacture are patented or secret, provided only that in every instance either the full process is of public record, or the true and exact composition of the finished product is made known. How else can one gain accurate knowledge of the effects of the medicines he administers? How else can he test the drug that is dispensed upon his prescriptions? How else can he be sure that the same thing is always furnished under the same name?

We would continue to use quinine, even if manufactured by a patented or by a secret process, because we have some means of learning whether or not the product offered us is what it purports to be.

So, too, antipyrin is subject to chemical analysis, or test, if not by physicians, at least by those competent to do such work, in the same manner as any of the drugs recognized by the Pharmacopeia is so

subject. But the nostrum praised by our correspondent is not subject to such analysis, because those who prepare *fraudine* have nowhere informed analysts what it contains; and if they choose arbitrarily to alter its composition to-morrow, there is nothing to restrain them from so doing. There is no means even of ascertaining whether they aim to produce an invariable product; or, in the other event, of gauging the average variation, as we can do in the case of some of the variable preparations recognized by the Pharmacopeia.

Our correspondent cannot fail to see that we agree with every tenable point in his argument, but that as a whole his argument is like "the flowers that bloom in the spring"—it has "nothing to do with the case." Unless we are entirely misinformed—and our waste basket has been encumbered with much printed matter, a number of pocket-wallets, and some dozens of powders forwarded us by the *Fraudine* Company—the status of his pet nostrum differs from that of antipyrin and from that of thymol-iodide in vital points. Its composition is not known, its method of preparation is not recorded; it is not even patented, but like plain, non-professional, every-day quack preparations, is merely trade-marked.

For these reasons, we must decline to prostitute our reading-columns to its exploitation.

So much for the issues raised by our correspondent. The moral and legal questions involved in the practice of trade-marking and copyrighting the names of medicinal preparations, and a consideration of the attitude the profession should assume toward these questions, we defer for future discussion.

THE DISPOSAL OF TUBERCULOUS CATTLE.

THE appearance of tuberculosis in a herd of Jersey cattle, owned by a resident of Philadelphia, the method of diagnosis employed, and the measures taken to eradicate the disease, deserve more than passing notice, inasmuch as the whole subject bears an intimate relation to the public health. The herd was an exceptionally fine one; it was selected with the greatest judgment, and has been maintained under the best hygienic conditions. An ordinary physical examination would have failed to detect signs of disease. As a part of a plan to employ every measure available for determining the soundness of the cattle, it was resolved to subject them to a diagnostic test that has recently been the subject

of a good deal of heated discussion. Tuberculin was injected, and careful observations were made. Thirty per cent. of the herd reacted with a marked increase of temperature, which is considered as indicative of the existence of tuberculosis. In order to verify the correctness of the test, six cows were slaughtered, and of this number five presented macroscopic evidence of the existence of the disease in more or less decided degree; while in one animal there was some doubt, which will be set at rest by the results of a careful microscopic examination. If a critical examination of the pathologic specimens preserved for the purpose fully confirms the results already obtained (and of this there seems scarcely a doubt), the slaughter of the cattle will be continued until every suspected animal is destroyed.

Apart from the demonstration of the value of tuberculin as a diagnostic test, great importance attaches to the course of action taken in its relations to the public health. It is a well-known fact that a considerable percentage of cattle is more or less affected with tuberculosis. It is also well known that tuberculosis may be communicated to man by the consumption of the milk and flesh of cattle suffering from this disease. Tuberculosis is the great scourge of the human family, and therefore any plan that can measurably diminish the disease by abridging one of its sources should be adopted without delay.

The course to pursue, under the circumstances, is a plain one, but it must be orderly and systematically carried out, under legislative enactments. The Legislature has a clear and responsible duty to perform. The conservation of the public health is paramount to all other considerations. Let the Legislature authorize the rigid inspection of all cattle—not a happy-go-lucky examination, but one conducted by experts versed in the best methods of diagnosis. Let all cattle condemned be promptly slaughtered, and a periodic inspection be continued, with full authority to decide and to enforce its legitimate conclusions.

It is not expected, as in the present notable case, that the owners of the cattle shall suffer the loss. The public is to receive the benefit, and, therefore, the expense of eradicating the disease should be a public charge. By a just system of indemnification all objection to the arbitrary disposal of affected cattle will disappear. It will cost the State a large sum of money, but the benefit to be derived is immeasurably great, and far outweighs any money consideration.

NEWS.

TUBERCULOSIS IN CATTLE.

Tuberculin as a Diagnostic Agent.

THERE is no aspect of the subject of tuberculosis that is not important. There is probably none more important than the prophylaxis. As the disease is in no small degree transmitted by the milk and flesh of cattle, any means that facilitates its detection in and eradication from the source of food-supplies must command earnest attention. It is on account of the vital importance of the subject that we present herewith a detailed report of the proceedings in connection with the discovery of tuberculosis and the slaughter of some of the cattle of a herd of valuable animals, and the means taken to eradicate the disease. Not an insignificant feature of the investigation is the part played by tuberculin as a diagnostic agent. The movement inaugurated should mark a departure in hygienic methods of practice.

HISTORY OF THE HERD.—The Clairemont herd of Jersey cattle was established about 1882-83, and springs from a number of imported cows which were bought at that time. Frequent additions to the herd have been made, from time to time, of animals bought in New York, Baltimore, and Canada, and none but the choicest individuals have been selected, for which high prices have been paid.

All of the leading strains of Jersey bulls have been used, and to-day the Alphaea, Rioter, Stoke-Pogis, Coomassie, St. Lambert, and Guilderoy blood is found represented by many splendid animals.

Every precaution has been taken to preserve the health of the stock and to increase their constitutional vigor. Inbreeding has never been practised, and the stables and animals have always been cared for in the best manner.

If good ventilation, the choicest of food, plenty of exercise, and pure water are potent factors in preserving the health of animals, this herd has been supplied with all of the conditions favorable to the most perfect health.

The herd has been regularly examined by experts, and the present outbreak of tuberculosis was discovered but a few weeks ago. In the rare cases in which the disease has heretofore been detected, the affected cattle have been destroyed at once, and their places in the stable disinfected.

By the use of tuberculin the disease was discovered in animals that seemed to be in perfect health, and it was not until this discovery that the heroic measures adopted were decided upon.

Experts hold that tuberculosis prevails to a great extent in many of the large herds of the country, and that it can be eradicated only by promptly killing all suspected animals. All agree that it is better to kill some suspected animals and find them free from tuberculosis, than to allow a single suspected animal to remain in a herd.

Mr. Gillingham's action is an example of public-spiritedness that has been seldom equalled, and the

public would profit immeasurably if others would follow a similar course. The sacrifice of animals worth thousands of dollars must command the warmest admiration.

REMARKS BY DR. PEARSON, *Assistant Professor of the Theory and Practice of Veterinary Medicine in the University of Pennsylvania.*

I was requested by Mr. Joseph E. Gillingham, several weeks ago, to examine a cow in his herd which did not seem to be doing well, and I found it suffering from tuberculosis. The animal was killed the next day, and the diagnosis was confirmed by the post-mortem examination. Thereupon I made a careful physical examination of the entire herd, and found five cows affected with the same disease, all of which were promptly destroyed. A short time after this, a fat cow that would not breed was killed for beef, and it was discovered to be in a highly tuberculous condition. This caused me to suspect that the disease might be more prevalent than we heretofore had reason to suppose, and with the object of detecting the affected animals it was decided to use tuberculin as a diagnostic agent. It is well known that tuberculosis in cattle is exceedingly difficult to diagnose, and that there are no physical signs by means of which we can recognize any but well-advanced stages of the disease. It is for this reason that tuberculin is so valuable as a diagnostic agent. The subcutaneous injection of a small quantity of tuberculin is followed by elevation of the temperature of a tuberculous animal, but not otherwise. These are, at least, the results that have been obtained by numerous foreign investigators, and by the Tuberculosis Commission of the Veterinary Department of the University.

Tuberculin has now been used on hundreds of cattle, and with the most satisfactory results. Of course, nothing is absolutely infallible, and there are a few cases on record in which the characteristic reaction to tuberculin failed to appear. But we must remember, in this connection, that many incompetent persons have experimented with tuberculin, and that of the vast literature of the subject some is untrustworthy.

It has also been said that tuberculin will cause a reaction in animals suffering from chronic inflammatory diseases other than tuberculosis; but it is well to call attention to the fact that tuberculosis frequently occurs in association with other diseases, and that in these cases the rise in temperature may have been due to undiscovered tuberculous lesions. That this may happen is shown by an occurrence in Germany. A cow was given an injection of tuberculin, and reacted characteristically; she was killed, and tubercles sought, but none were found. It was thought that the agent had failed, until the animal had been hung up and the vertebral column divided, when well-developed tubercles were found in the bones of the back.

In the few cases in which reactions followed the use of the agent and post-mortem examinations have failed to disclose the existence of tuberculosis, may not similar conditions have been present? In all, seventy-nine of Mr. Gillingham's cattle have been tested with tuberculin, and of these thirty have reacted in a manner that has been interpreted as indicating the existence of tuberculosis.

Of these, two have been killed, and were found to be diseased. After discovering how prevalent the disease probably was in the herd, the question of the disposal of the animals became the all-important one. Three courses were open: The animals might have been kept, as they were all apparently in good condition and appeared well, and many were yielding large quantities of milk; or they might have been sold, for they seemed to be in perfect health, and would undoubtedly have brought good prices; or, lastly, they could be killed, and thus the danger of contamination of the other animals and of the milk be removed. Mr. Gillingham did not, for a moment, consider any but the last method of disposing of the animals. As soon as tuberculosis was discovered, he ordered the affected cows destroyed, and the milk from animals known to have tuberculosis has never been sold or used. The remaining healthy animals will be placed in disinfected stables, frequently examined for incipient tuberculosis, and strictly kept from associating with suspected animals. In this way it is hoped that the progress of the disease will be checked, and the health of the remaining animals preserved.

REMARKS BY DR. GUITÉRAS, *Professor of Pathology in the University of Pennsylvania.*

It is seldom that an opportunity like the present offers for experimentation on so large a scale. Here, indeed, the public spirit of the owner of these animals has vied with the magnitude of the subject. The occasion is, therefore, one that well deserves earnest attention, and it may interest the public to have the problems here involved presented from their several points of view.

The facts are briefly these: A number of animals in a fine herd of cattle is suspected of being tuberculous. In a few of them the diagnosis has been confirmed by post-mortem examination. In others, apparently healthy, the suspicion rests mainly on evidence furnished by the use of tuberculin as a means of diagnosis. As you have heard, it is now proposed to kill the animals.

There are several lessons to be learned from the investigation of to-day.

1. The value of tuberculin as a means of diagnosis will be proven. When a physician pronounces a case to be tuberculous, he is nearly always right, because there is hardly a subject in medicine that has received more careful and successful study than this. Occasionally, however, the physician will find that his suspicions have been unfounded, or, more often still, he will find tuberculosis when it was not suspected. It appears that tuberculin can reduce very considerably the number of such errors. The experiments made in Karlsruhe, Dresden, and Dorpat, and in France, show that the masked tuberculosis of the lower animals may often be detected by means of tuberculin.

2. Our attention should be called to the example that is to be given to-day of an earnest and grave consideration of a question relating to the public health. Of all medical problems none equals in importance that of tuberculosis—a disease that causes one-seventh of the deaths of the human race. Whenever it can be clearly shown that its progress can be arrested in any direction, no sacrifice is too great if it brings about the desired end. Tuberculous cows are a menace to the public

health. The following facts will leave no doubt as to this. The meat of a tuberculous cow contains the microbes of tuberculosis. Even after such meat is cured by smoking or salting, it can by inoculation be successfully used to produce an experimental tuberculosis in some of the lower animals.

Another danger is that of transmission of the disease by means of milk. In many localities it has been found that ten per cent. of stall-fed cows are tuberculous. Of these, fifty per cent. will yield milk containing the microbes of tuberculosis—milk that can be inoculated into guinea-pigs and produce tuberculosis. Of course, the material thus used by the experimenter is placed under conditions the most favorable for a successful inoculation. In the natural course of events this is far from being the case. On the contrary, innumerable agencies, some of which are unknown, render the process of transmission of the disease much more difficult than it is in the hands of the experimenter. Hence it is that we do not all have tuberculosis. But we stand between this evident source of danger and the frightful mortality that I have mentioned. I will not leave this subject without saying that a temperature of 68° C., kept up for thirty minutes, will destroy all the bacilli of tuberculosis that may be present in milk.

It is not alone in the food-supply that the products of tuberculous cows may be brought to us. Indeed, it is probable that in the majority of instances we take in the tuberculous material by inhalation, and not by swallowing. The tuberculous material taken in by inhalation has more chances of taking root, as it were, than that which is swallowed.

And how is milk inhaled? By drying wherever it may fall, and being blown about with other particles of dust. Guinea-pigs can experimentally be made tuberculous by putting some dust under their skins; and if the dust is obtained from rooms in which tuberculous patients are being treated, the chance of a successful inoculation is much greater than in the case of dust taken from other apartments. The conclusion to be derived from this is that we should not allow tuberculous patients, human or otherwise, to make tuberculous dust.

3. We shall look forward with great interest for the result obtained by the destruction of these animals. How far will the desired end of eradicating the disease be attained? How far may the young cattle be already tainted? How far may the premises be infected?

It may be possible, by this experiment, to demonstrate how tenaciously the infecting material may adhere and be renewed about premises that have once been infected, or by what means it may be destroyed.

It is by no means easy to demonstrate the success of measures of disinfection of premises against tuberculosis. I would suggest that in carrying out measures of this kind attention should be paid to the removal of all classes of vermin existing about the premises, especially rodent animals, that might be the means of perpetuating the evil. I once saw what appeared to be a successful disinfection of a country house against tuberculosis, and it was signalized by the destruction and driving away for months of mice, bats, and insects. In disseminating the germs of disease there can be no doubt of the pernicious activity of these agents.

REMARKS BY DR. SHAKESPEARE, *lately U. S. Commissioner to Investigate Cholera in India and Spain.*

We learn from the census of 1880 that we possessed in this country about 43,400,000 cattle, 49,000,000 sheep, and 51,800,000 swine. Of these animals, it is the common experience that cattle and swine suffer most from tuberculosis. Passing by without remark the ravages of tuberculosis of swine, I shall briefly endeavor to show the importance of the subject as regards the interest of cattle breeders and dairymen, and point out its relations to the public health.

1st. *As to the extent of tuberculosis among cattle.*

The statistics concerning the extent of tuberculosis in cattle are exceedingly incomplete, and for some countries entirely wanting; but it may be safely said that whatever the figures they are far short of the real truth.

Taking all cattle of all ages and uses, including calves, a low estimate of the average percentage of those visibly affected with tuberculosis is two per cent. The highest percentage of disease is by common observation found to be among the milch-cows, and it ranges in different herds and localities, from three to ten or more times the general average. It will be within truth, therefore, if we say that in 1880 there were in this country 868,000 cattle affected with tuberculosis. Every bovine animal suffering from tuberculosis will ultimately die of the disease if it be not killed. This means a loss to the farmer (placing the value per head at twenty dollars) of \$17,360,000 per annum. In 1880 there were 12,443,000 milch-cows. Estimating the percentage of disease among them at ten, a conservative figure, we find that 1,244,300 were tuberculous. Fixing the value per head at thirty dollars, we learn that the loss, if these animals were not sold in the shambles for beef, is \$37,329,000.

2d. *Tuberculosis is highly infectious and contagious among cattle and swine.*

It is now universally recognized by competent veterinarians and pathologists that tuberculosis is virulently infectious and contagious among cattle and swine, and it is an established fact that as a rule higher-bred and well-cared-for herds suffer most from its ravages. Once started in a herd, unless the most vigorous and judicious means are early enforced for stamping it out, it bodes the slow but certain destruction of the majority, if not indeed of the whole. The infectious principle is contained in the material that comes from the diseased parts; that is, in the matter which is coughed up from the lungs, and is either swallowed or thrown off in the act of coughing. The bowels are often ulcerated. The excrement, therefore, contains the discharges from these ulcers, as well as the matter thrown off from the lungs which is swallowed. This infectious material has been, unfortunately, found to be highly resistant to the action of the ordinary natural agents of destruction, such as drying, freezing, and the like. The excrement and the matter expectorated, therefore, infects for a long time the stables and other places frequented by the affected animals, becomes dry, powdered, and rises in the dust, to be inhaled and swallowed by healthy companions, that in their turn contract the disease, and themselves form new centers of infection. It seems to be pretty clear also that sometimes, in cattle, the disease is transmitted to the offspring from a tuberculous bull,

who may be suffering from a concealed tuberculosis of the genital apparatus.

3d. *Absolute necessity for the enforcement of vigorous measures to eradicate the plague, and economy alone in their prompt and unstinted adoption.*

Experience has proved the utter uselessness of temporizing, by trusting to quarantine of visibly affected animals and disinfection of stables, etc. The only measure that promises any degree of certainty to arrest and prevent further ravages in a herd, is the prompt destruction of not only all visibly affected animals but also of *all suspected animals*, accompanied by as thorough a disinfection of the surroundings as is known to modern science. Mr. Gillingham has, in my opinion, in deciding to follow the course recommended, done well from the standpoint of advanced public spirit. But he has adopted a course which in the end—notwithstanding its great first cost—will most benefit his own pocket. *It is unquestionably the economical course.*

4th. *The constant danger to the public health from tuberculous cattle.*

I have now reached the most important part of this question for the general public.

Tuberculosis in the human being is possibly more prevalent than among cattle. It is estimated by reliable mortality statisticians that from one-fifth to one-seventh of all deaths are due to some form of tuberculosis. The disease is now recognized to be less hereditary in the human being than it is infectious. There is no fact better established in medicine to-day than that the human being who has no hereditary tendency whatever to tuberculosis can acquire the disease by taking into the system the infectious principle of the disease. One of the most frequent modes of infection in man is by inhalation. But it is also certain that in the laboratory the disease can be easily produced artificially in animals experimented on by way of the digestive canal.

There is ample evidence that a large percentage of tuberculous milch-cows produce milk that contains the infectious principle of the disease. The use of such milk for infants' food without boiling constitutes an undoubted danger that they may become infected. In fact, since tuberculosis in the human race has become better known it has been found that in infants and young children in some large cities the mortality from some form of tuberculosis is far greater than has been generally believed, amounting in some localities to one-fifth of the deaths in the young. The significant fact in this connection is that it is most frequently some part of the digestive passages that become first affected. In conclusion, I wish to say that the experience of Mr. Gillingham is by no means single or at all uncommon. It is, however, uncommon for one in his situation to adopt so wise a course. I wish to enforce his experience as one more of the numerous examples of the necessity for the general public in large cities to see to it that there is proper inspection of their meat and milk supplies.

REMARKS BY DR. A. C. ABBOTT, *First Assistant in the Laboratory of Hygiene, University of Pennsylvania.*

Prior to the introduction of tuberculin by Koch, bacteriological studies were directed more to checking the spread of infectious diseases by means of vaccination

with either modified organisms or their nutritive products than to the therapeutic employment of these substances in the treatment of disease already in progress.

The method employed by Pasteur for the treatment of rabies, which, in many respects, appears to be analogous to the method of Koch, though certain essential points are lacking to permit our making the positive statement, was the only therapeutic employment of what seem to be the products of growth of bacteria, or modifications of the substances composing the bacteria themselves. I say, seem to be, for we are not yet in a position to say that bacteria are the agents underlying the condition known as rabies.

Until the introduction of tuberculin the method in vogue for preventing the spread of infectious diseases was, in the main, that of causing a mild or modified form of a disease by inoculating the animal with the organisms concerned in its production after their virulent character had been so altered by chemical or thermal agents that they no longer possessed the power of producing the malady in its normal intensity. This modified attack often afforded immunity against a subsequent attack of the same disease.

Another common method aimed at causing certain indefinite reactionary changes in the tissues by the introduction into the animal of the chemical products of bacterial growth from which the organisms that had produced them had been carefully separated by filtration.

In both of these methods the application of high temperatures, particularly in the latter, was fatal to the success of the experiment, for the virtues of the immunity-affording substance that existed in the chemical products of these special bacteria, that had been studied in this direction, were entirely destroyed by these temperatures.

It is plain, therefore, that, unless the separation of the living and virulent organisms from the chemical products that were employed as a vaccine was perfect, it was quite possible to cause the appearance of fresh cases through these inoculations instead of checking the spread of the disease.

By the method employed in the preparation of tuberculin such an accident is not possible, for since its virtues are not destroyed by the action of heat of sufficiently high temperature to kill all living bacteria that might have been concerned in its production, this exposure to high temperature forms a regular step in the routine of its manufacture—a step intended to render the material harmless.

Whether we are justified in saying that the active principle of this substance, tuberculin, is the product of growth of the bacilli, or the bacterio-protein of the bacilli themselves, it is not at present possible to say with certainty, as in its manufacture both substances are to a degree spared. It seems reasonable, however, to consider the systemic reactions that appear in tuberculous animals after inoculation with this agent as due, in all probability, to the combined action of both substances.

As we are now aware, tuberculin is the concentrated fluid medium in which the tubercle bacilli have been growing. Its preparation, in short, is as follows: Tubercle-bacilli are cultivated preferably upon fluid media

to which 6 to 7 per cent. of glycerin has been added. When the culture has reached the maximum of its growth it is subjected to a degree of heat sufficient to destroy all living bacilli. It is then carefully filtered through unglazed porcelain and the filtrate is evaporated over the steam- or water-bath to the proper degree of consistency.

The statement that tubercle-bacilli have been found in tuberculin, not only in that supplied by Koch, but also in samples from other sources, is perfectly true; but the impression that this statement, stopping where it does, is likely to make upon the minds of those unacquainted with the method of preparing this agent, is by no means in accord with the true state of affairs. The method of preparation of tuberculin, as we have seen, insures the death of all living tubercle-bacilli from which it is extracted by subjecting them during the process to a degree of heat for a length of time quite sufficient to render them inert, in so far as their power to produce tuberculosis is concerned. For this reason it is by no means essential to the safe employment of tuberculin as a diagnostic agent that the fluid be deprived of all these dead and inactive organisms. The only undesirable results that might, and indeed would be very apt to occur, are purely local results—results finding expression in slight suppurative processes at the point in the tissues at which the dead bacilli accidentally present in the tuberculin are deposited. Koch, Prudden and Hodenpyl, Weil, Maffucci, Wissokowicz, and others, in their published accounts of experiments with this agent, all call attention to the local suppurations that sometimes occur at the point of inoculation, due, most likely, to the pus-producing properties of the proteid substances composing the bodies of the dead bacteria themselves—a process, however, that is in no way connected with general tuberculosis, and is of itself not of a dangerous nature.

As to the danger of using the milk of cattle that have been inoculated with tuberculin as a means of diagnosing tuberculosis which is so slightly advanced as not to be recognized by any other means, I think there can be but little fear, and still less from its employment in non-tuberculous animals. This, however, is not the case with the milk of cattle in which the disease is more or less advanced, as has been pointed out by a number of observers, particularly Bang, Tschucca, and Ernst. In these cases there is not only danger in the immediate use of the milk, but, by keeping, this danger is increased, because, as has been observed, the bacilli not only retain their life properties, but actively increase and multiply in the milk in which they are located, retaining all the while their disease-producing peculiarities. In a series of experiments performed by me, and published two years ago in the *Johns Hopkins Hospital Bulletin*, I showed clearly that milk, as it comes from the shops, is an excellent medium upon which to cultivate these organisms. From our present knowledge on this subject, there is doubtless a greater amount of infection through this agent than is ordinarily supposed, particularly in the case of children, who depend so largely upon milk as an article of food. Indeed, several cases of apparently direct infection from the use of milk of tuberculous cattle as food for infants have been published. Where no rigorous control of dairies supplying

milk to the market exists, the only safeguard possessed by the public against possible infection through this medium is the protection afforded by sterilization of the milk employed, either by boiling or through the employment of steam-sterilizers.

In regard to butter and cheese, it has been shown by investigations conducted at the Imperial Health Bureau, of Berlin, that tubercle-bacilli may and do retain their vitality in these substances frequently for weeks.

SOCIETY PROCEEDINGS.

BUFFALO CLINICAL SOCIETY.

Meeting, March 12, 1892.

DR. MYNTER read a paper on "The Treatment of Coxalgia," illustrated by cases. He considered one point in particular, namely, operation. He described the pathology of the trouble as follows: A local tuberculosis develops in the neck of the bone, with subsequent perforation into the joint and resultant coxitis. Because in resections performed at a late stage, inflammation of joints is usually found, it was supposed that the disturbance originated in the joint; but this is not the case. The synovitis and arthritis are usually results of the primary process in the bone. The inflammation may extend downward and cause a chronic osteomyelitis.

In treatment orthopedic surgeons attempt by extension to overcome the contraction. The contraction but indicates that the local disease has perforated the joint. Extension prevents the degeneration of the muscles, but it is only a symptomatic procedure, and not directed against the cause of the disease. In early cases, when good hygienic surroundings can be provided, it is well to wait a short time, to see if recovery will spontaneously take place; but such a result is only to be anticipated under the most fortuitous circumstances.

The injection of iodoform into a coxalgic joint is also but another symptomatic method of treatment. It will do little good unless the starting-point of the disease is found and radically treated.

When tuberculosis is found in a gland or in bones elsewhere, the surgeon endeavors to remove the disease by enucleation or curetting. Why should not the same principle be applied in the treatment of hip-disease? The point may be illustrated by a case: A patient is ill for two or three weeks, with tenderness and swelling around the neck of femur, showing that a local process is going on. A long incision is made down to the bone, exposing its anterior surface; then, by flexing the thigh, the whole lower portion of the neck of the bone can be plainly seen. A tuberculous abscess is found, its contents evacuated, and the wound is closed. Two weeks later sudden pain appears at hip, which seems to indicate perforation of the joint. Resection is performed two weeks later. The joint appears healthy; but on splitting the head and neck of the femur the diseased process becomes manifest, as seen in the specimen exhibited.

Amputation in hip-disease usually becomes necessary when a chronic osteomyelitis attacking the shaft of the bone has occurred. In one case of resection the bone

was diseased in its entire medulla down to the condyles. With a long spoon the canal was scraped from above downward, and a drain of iodoform gauze inserted. All symptoms disappeared, and the patient is on the highway to recovery.

It is thus seen that such cases can be treated without amputation.

Is it proper to treat symptoms for six years by means of splints, extension, etc., and leave the disease pursue its own course? Dr. Mynter stated that he had performed twelve resections in the preceding two years, with two deaths—one from intercurrent scarlatina; in all of the others perfect joints and free motion had resulted. Two of the cases were presented in apparent perfect health. Six had been shown on previous occasions.

In the discussion, DR. TREMAINE said that each case is a law unto itself. There are two schools in regard to the pathology of hip-joint disease. One believes in the strumous habit or diathesis, and assigns to trauma the exciting influence. The other school claims that tuberculosis is the sole cause. For every germ a certain soil is necessary, upon which it will more readily develop. Such a soil is the scrofulous or strumous habit. It is claimed by some that in many cases tubercle-bacilli are not found.

In the majority of cases an osteitis is present. It seems the rule that the process is an osteitis in the head of the bone, produced by trauma in a person of strumous habit.

In treatment, extension affords physiologic rest, so necessary in the rational treatment of all inflammation. It also serves to keep or pull the articular surfaces from each other; its purpose is not only the prevention of contractions.

In a large number of cases cures have been effected by extension, when applied early.

It is difficult to tell at the outset whether the disease be due to tuberculosis, to synovitis, or to osteitis; and it is best to give the patient the benefit of the doubt, using rest and extension; and when necrosis occurs, then resection, but only in young subjects.

DR. ROSWELL PARK stated that hip-joint disease (coxalgia) is always essentially tuberculous. Chronic synovitis is not coxitis, nor does it produce the same early symptoms, so characteristic of tuberculous disease.

Tuberculosis is a degenerative and destructive process. The other affections of the joint are regenerative, causing, like tuberculosis, deformities, but of a different nature.

Primary synovitis is rare, occurring probably in one case of ten. The diathesis itself is a most important diagnostic symptom.

In treatment, extension, preferably called traction, is now the recognized practice the world over. In a healthy joint the atmospheric pressure is very great, from fifty to sixty pounds being necessary to overcome it, hence the usual traction will do little to separate the surfaces; but when ligaments are worn and diseased, then traction is too late and resection is necessary.

The only object, therefore, that extension can have is to produce physiologic rest; and in the early stages of the disease it has yielded good results, although the advocates of the system are satisfied and speak of cure when ankylosis has been obtained. This is but substituting one evil for another; it is not cure.

Resection followed by a movable joint is far more to be preferred. Reports of cases are not necessary to fortify Dr. Mynter's position; the specimens of bones shown, split open, with the diseased process plainly visible, are quite sufficient. When several joints are affected, one after the other, they should be treated successively. In one case, in which resection of shoulder-joint, hip-joint, and elbow-joint was performed, and the shafts of one or two other bones were scraped, the patient recovered, whereas the result would, no doubt, have been otherwise had this heroic treatment not been carried out.

DR. HEATH stated that the treatment often depends largely on the social position of the patient, his environment, etc. Many cases get well without operation. Ankylosis is not cure, but as a result it is as good as the shortening that follows resection.

In closing the discussion, DR. MYNTER expressed the belief that when traction was exerted, the knee-joint in time became affected, becoming relaxed and unsteady. In one case of multiple joint-disease, the right knee-joint was first resected, then two months later the left hip. The patient died of scarlatina.

Trauma is often the primary cause. Resection is at once performed in every case. Dr. Mynter had had only one case under his care in which a cure was obtained by traction, and this case was probably not one of hip-disease. Physiologic rest is no doubt proper at first; but when decided febrile symptoms, crepitus, and tenderness around the neck of the bone appear, then operation is indicated. The process will extend unless so treated. Abscess is often a symptom; it is usually extra-articular, being situated in the head of the bone or in the trochanter. When the tissues have been divided, the abscess should be followed up to see if it communicates with the joint. Amputation has been performed when resection would no doubt have sufficed.

White, of Manchester, states that in 100 cases he had a mortality of 3 per cent., and the results were far better than ankylosis.

Under orthopedic measures from 10 to 15 per cent. die of tuberculosis of other organs. This is not the case after resections.

Cure is usually obtained in three months. It is a good rule first to try the anterior incision, and if the joint is affected, then resection should be performed.

OBITUARY.

DR. D. HAYES AGNEW.

DR. D. HAYES AGNEW died at his residence in Philadelphia on March 22d, after a brief illness. Dr. Agnew was born in Lancaster County, Penna., in 1818. He received his preliminary education principally at Moscow University, at Jefferson College, Canonsburg, Penna., and at Newark, Delaware. His medical training was obtained at the University of Pennsylvania. He was graduated in 1838, and began the practice of medicine in Lancaster County. After a short time, however, he withdrew from medical practice and engaged in business, in which, however, he was not very successful. He returned to

the practice of medicine in Philadelphia about the year 1852.

During his residence in the country he continued the study of anatomy, including dissection, under all the disadvantages incurred at a distance from the natural source of anatomic material. On resuming practice in Philadelphia, he at once began to teach anatomy in what was known as the Philadelphia School of Anatomy, in Chant Street. His success here was immediate and phenomenal, and so long as he continued to teach, he drew large classes from both of the schools of medicine then in existence.

In 1854 he was chosen one of the Surgeons to the Philadelphia Hospital, where he had his first opportunity of applying to practice his wondrously accurate knowledge of anatomy. His connection with the Philadelphia Hospital was further distinguished by his originating the present Pathological Museum, of which for a time he was curator. In 1863 he was appointed Demonstrator of Anatomy and Lecturer on Clinical Surgery in the University of Pennsylvania. In 1870 he was elected Professor of Operative Surgery, and on the resignation of Dr. H. H. Smith, in the following year, he was appointed to the position of Professor of the Principles and Practice of Surgery. He continued to hold the last position, in which he made his most signal reputation, until December, 1887, when he resigned, his resignation to take effect at the close of the session of 1888-89.

Dr. Agnew was one of the Surgeons to the Pennsylvania Hospital and to the Orthopedic Hospital in 1865. He retained these positions until the demands upon his time made it impossible to hold them longer—in the case of the Pennsylvania Hospital, with a brief interval, for eighteen years; in that of the Orthopedic for a shorter time.

Although Dr. Agnew laid the foundation of his reputation as a teacher of anatomy, and prepared himself for his success as a teacher and practitioner of surgery, it was in the Chair of Surgery at the University of Pennsylvania that his reputation culminated. His lectures were characterized by lucidity and an absence of all attempt at oratorical display. The accuracy of his anatomic knowledge made the subject of operative surgery particularly simple to him, and his lectures upon this branch were most attractive and eagerly attended by students and practitioners. His ability in this direction shone forth still more brilliantly in the surgical clinic that for so many years he held every Wednesday at the University.

Dr. Agnew's writings were, in the main, short papers on practical subjects, until he wrote his great book upon *Surgery*, finished in 1878; this was the crowning act in making world-wide a reputation that was already national. His *Surgery* has been translated into the Japanese language.

His connection with the Garfield case and the modesty with which he performed the duties incident to this trying position, did much to attract the attention of the non-professional world and endear him to the nation.

Dr. Agnew continued to practise actively until a few days before his death, although for several years previously to this event, he had been making an effort to withdraw from work. How difficult this was appeared on the very last day on which he was out, when the

fatigue of an operation and several wearisome consultations seemed to be the immediate cause of his last illness. He had been ill earlier in the winter with influenza, and seemed not to have entirely recovered his strength, although he expressed himself to the writer only a few days before his illness as feeling unusually well, and certainly he had greatly improved in appearance of health since the 1st of February.

The secret of Dr. Agnew's success may be said to have been, first, his thorough training in anatomy; secondly, the reputation that he acquired as a teacher of anatomy; thirdly, his skill as an operator; fourthly, his unwearying industry; and fifthly and last, but not least, his personality.

Of a commanding and dignified presence, with the courage of his opinions, associated with such a modesty and utter contempt of acting for effect, he has been, at least for the last decade, one of the most conspicuous figures in the medical history of the country. Prominent, also, in his relations with medical men was the feeling of confidence that he inspired, and the certainty with which it was known that he would never betray the trust reposed in him—would always protect with his towering reputation any weaker points that the inexperience of his younger colleagues might have betrayed.

WILLIAM H. BUNCE, M.D., died in Oberlin, Ohio, February 13, 1892, where he had practised medicine from the time of his graduation. Dr. Bunce was born in Paterson, N. J., June 29, 1830. He came of ancient Scottish stock. He was married in June, 1852, to Eleanor S. Conant, who, with two daughters and one son (Dr. Wm. C. Bunce), survives him. Dr. Bunce was a Surgeon, with rank of Major, during the war; and was connected with a number of medical societies, in which he had at various times held prominent positions. He has been known as one of the leading surgeons of Northern Ohio. There was a peculiar gentleness in his ministrations to those that came under his care, which made them feel that he was not only their physician, but also their friend. It may be well said that by his skill and worth he has built a monument that will live after him, in the hearts of those that learned to love him.

NEWS ITEM.

Sixth Annual State Sanitary Convention of Pennsylvania.—The State Board of Health of Pennsylvania will hold the Sixth Annual State Sanitary Convention in the city of Erie. A hearty invitation is extended to all persons in any way interested in sanitary matters to visit Erie upon this occasion. The Convention will be held March 29, 30, and 31, 1892. It will be called to order on the 29th, and end on the afternoon of the 31st. Commutation rates can be obtained by writing to DR. WILLIAM B. ATKINSON, Medical Inspector, 1400 Pine Street, Philadelphia, Pa.

BOOKS AND PAMPHLETS RECEIVED.

The Therapeutic Aspect of Some Ovarian Disorders. By Edward W. Jenks, M.D., LL.D. Reprint, 1891.

Ueber Autotuberkulinisation beim Lupus. Von Dr. P. G. Unna. (Aus Berlin. klin. Wochenschr., 1891, No. 25.)